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Monthly Message

In 1911 I took a course in sociology under Professor T. N. Carver at Harvard. In his first lecture he propounded the question, "What is progress?" That became our theme of discussion for the entire year and the course ended with the same question. Many times we think we make progress when, as a matter of fact, all we do is to bring about change.

Although unquestionably we have made strides of real progress in medicine during the past half century, still we must not lose sight of the past. Every now and then we should ask ourselves whether or not we are deviating from our main axis, so that we find ourselves in periods of change rather than progress. Our emphasis has been on scientific medicine, physiology, and the natural sciences as they affect man but, as Dr. George P. Berry points out, "As medical education has become more complex, it has splintered" and, "each splinter is rapidly accumulating its own body of knowledge forcing the specialties further and further apart."

Therefore, it is time to reappraise the whole subject of medical education to ascertain whether or not it should be put together and presented to the student with greater effort in a more synoptic type of instruction so that man may be considered as a whole with the various aspects of medical teaching centered about him and co-ordinated one with another, rather than considering each organ or system as an entity unto itself. Already several experiments are in operation at some of our medical schools and the Association of American Medical Colleges has begun a series of six annual teaching institutes to consider the whole structure of medical education: (1) physiology, biochemistry, and pharmacology; (2) pathology, microbiology, immunology, and genetics; (3) anatomy, histology, embryology, and anthropology; (4) medical ecology; (5) clinical teaching including the internship; and (6) specialty training and the continuing education of the physician. These institutes should be provocative of considerable free discussion, and all of us in the medical profession will await with great interest the reports of the proceedings.

Frank B. Berry

FRANK B. BERRY, M.D.
Assistant Secretary of Defense
(Health and Medical)

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Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this *Journal.*

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EARLY MANAGEMENT OF THE PARAPLEGIC PATIENT

HOWARD A. RUSK, *Brigadier General, USAFR (MC)*

SINCE the adoption of the policy early in the Korean conflict of transferring severely disabled patients to the Veterans Administration hospitals as early as possible, the military medical officer is not as likely to be responsible for the rehabilitation of paraplegics as formerly. The management of the patient with traumatic paraplegia from the onset of his injury until such transfer takes place, however, is definitely a responsibility of military medicine; and much of the later success in restoring the patient to the best mode of life of which he is capable is dependent on early management.

Paraplegia is usually thought of in terms of battle casualties, but the number of cases resulting from accidents is of significance in itself. In World War II, about 2,500 were thus disabled as a result of battle injuries, accidents, and disease, but during this same period some 15,000 civilians became paraplegic from accidents alone. Although more than 1,700 of the original group of 2,500 World War II paraplegics have been discharged from Veterans Administration hospitals, for every patient discharged there has been an admission as a result of accident or disease.

Experience in military and Veterans Administration hospitals and civilian rehabilitation centers has shown that, despite the severity of their disabilities, a high percentage of paraplegic patients can be retrained to live productive lives. Experience has also shown that it takes more than twice as long to clear up the complications due to inadequate management, such as kidney disorders, decubitus ulcers, and contractions, than it does to complete the total rehabilitation program *per se*.

In general, the management of the paraplegic patient falls in two broad phases, the definitive and rehabilitation phases. However, as Kessler and Abramson[1] have pointed out, ". . . the

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division between definitive and rehabilitation medicine is purely artificial; actually, both phases must proceed simultaneously and they must be carefully integrated so that they become part of the one-overall program directed toward a common goal."

In both of these phases, the needs of the patient can be met only by an integrated team approach to the patient and his problem. The internist is concerned with the patient's nutritional problems; the neurosurgeon, with the compression of the spinal cord, pain, and relief of spasticity by surgical methods; the orthopedist, with contractures, spinal deformities, and bracing; the urologist, with the problems of the bladder; and the plastic surgeon, with decubitus ulcers. No one person, regardless of his experience and training, can be competent to meet these diverse needs of the patient.

MANAGEMENT OF THE ACUTE INJURY

Of particular importance to the military physician is the management of the patient during the acute period following the injury. The proper management of the patient from the time of his injury before he can be moved, a period of 14 to 18 days, can prevent a great many of the complications that are frequently associated with spinal cord injury, spare the patient subsequent discomfort, and reduce the cost of extensive hospitalization.

A patient suffering from partial or total paralysis from acute spinal cord injury should be removed from the scene of the accident with the greatest care. Blood loss and surgical shock are rarely important factors except in multiple injuries. Frequently the spinal cord has been transected after the accident by overzealous first-aiders who remember the old rule, "transport the patient with the spinal cord in hyperextension." This rule is obviously illogical because posturing should depend on the type of injury. The patient's back should not be flexed or hyperextended. His head should not be lifted unless its position interferes with respiration. He should be transported in a neutral position on a level surface such as a stretcher or a wide, flat board. If he must be lifted, this should be done slowly, preferably with men working together to keep his head, neck, back, and legs all held straight in the neutral anatomic position. An ordinary door, because of its size, strength, and rigidity, makes an excellent stretcher. Care should be taken not to bounce or jostle the patient.

As little movement as possible should be allowed during the patient's initial care. Roentgenograms of the back should be taken on the original stretcher. It is preferable to defer roentgenography rather than risk further trauma.

A flat, hard surface with a foam-rubber mattress is satisfactory for a bed and a Stryker frame may be used to enable nurses and attendants to turn the patient frequently without risk of further injury. Particular care should be given to the selection of trained nurses and attendants, as a single twisting or flexion of the spine may be enough to make a reversible spinal cord lesion into an irreversible lesion with no hope of further return of function to the muscles of the lower extremities.

In our experience at the Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center, early laminectomy is desirable in spinal cord injuries (except in high cervical lesions), especially if block is demonstrated. We believe that it is impossible to diagnose accurately transection in contradistinction to malfunction due to contusion and edema. Laminectomy done by a skillful neurosurgeon carries with it such a minimum risk that only in multiple injuries and shock should its exclusion be seriously considered. Psychologically, laminectomy is invaluable in the rehabilitation phase for if the patient can be told unequivocally that his spinal cord is transected, acceptance comes much more easily and facilitates an active training program tremendously.[2]

MANAGEMENT OF SPECIFIC PROBLEMS

Skilled nursing care in the management of the paraplegic patient is fundamental.[3] He should be turned at least every two hours, night and day, to prevent bedsores. Decubitus ulcer most frequently occurs in the sacrum, trochanter, and ischium. In addition, ulcers may develop over the knees, on the heels of the feet, and on the forehead in the case of a patient with a cervical vertebral fracture in the prone position. Light massage of the skin over pressure areas can be of help in preventing ulcers.

During the period of spinal shock, many paraplegic patients cannot lose body heat by perspiration from the paralyzed portions of their bodies, and, consequently, there may be spontaneous febrile episodes. If specific causes cannot be found, antipyretic measures such as acetylsalicylic acid, fans, cold sponge baths, and ice water enemas can be used. Sweating usually returns after spinal shock subsides, and in some patients profuse sweating may develop over the nonparalyzed portion of their bodies.

Because few paraplegic patients have severe pain, opiates should be avoided if possible. In most instances pain can be controlled with acetylsalicylic acid compound and sedatives, while opiates should be used only as a last resort. The paraplegic patient who is also a drug addict presents one of the most difficult problems in medicine.

Acute spinal cord injury may be followed by profound distention of the bowel. This occasionally becomes so severe as to embarrass respiration, interfere with ingestion of food, and produce severe discomfort. Distention should be treated with neostigmine methylsulfate (prostigmine) intramuscularly or by rectal tube, enema, and, if necessary, Wangensteen drainage. The rectum should be emptied every other day by suppositories, enemas, or digital evacuation.

An indwelling urethral catheter (Foley) should be introduced early during the acute period. The bladder should be irrigated three times daily with isotonic sodium chloride solution. Care must be taken that the catheter does not become blocked, and it should be changed at least twice weekly. Absolute asepsis must be the rule throughout. The abdomen must be checked frequently for bladder distention.

The use of small, repeated doses of a urinary antiseptic, such as methenamine or of sulfonamides will help prevent urinary infection. The development of bowel and bladder automaticity requires meticulous training through the co-operative efforts of the physician, nurse, and patient.[4]

METABOLIC MANAGEMENT

A high-caloric (4,000), high-protein (150 gram) diet is essential, with protein hydrolysates added if tolerated. If a patient cannot eat satisfactorily, whole blood, serum albumin, or plasma expanders should be given intravenously in small, repeated doses. Plasma should be used with caution because of the possibility of hepatitis. As Cooper and Hoen[5] have pointed out, any acute injury to the spinal cord which is sufficiently severe to cause paraplegia produces a marked catabolism of body protein which is reflected in the urinary excretion of large amounts of nitrogen. During the first two weeks after injury, there is invariably a strongly negative nitrogen balance of as much as 25 grams a day. Because a high-protein diet may increase nitrogen output, clinical difficulties are commonly encountered in maintaining an adequate nutritional balance. In the majority of patients, however, a normal nitrogen balance is reestablished eight to 10 weeks after injury.

Other metabolic disorders reported by Cooper and Hoen include impaired liver function, as evidenced by the bromsulphalein liver function test; an invariable decrease in basal metabolic rate; unilateral or bilateral mammary enlargement in about 20 percent of male subjects with traumatic paraplegia; testicular atrophy in more than 50 percent of male patients; and cessation of menstruation for a period of three to six months in young adult female patients.

An intramuscular injection of 50 mg. of testosterone propionate daily from the first day of injury will decrease the incidence of tissue breakdown, osteoporosis, weight loss, and decubitus ulcer formation.

Patients with paraplegia often exhibit marked atrophy of the unaffected upper extremities from disuse or malnutrition.[6] It is important, therefore, that conditioning exercises be started early. Patients should be started on active exercises of the unaffected parts of the body with special precaution to prevent spinal flexion or hyperextension. Exercises to strengthen the triceps and finger flexors are particularly important as these muscles are essential in "crutch walking." Many hospital routines include a trapeze or monkey bar to facilitate movement. This, however, does nothing to develop the tricep muscles; in fact, because gravity pulls the patient down, there is often a disuse atrophy of the triceps.

Twice daily all joints of the lower extremities should be moved passively 10 times through a complete range of motion. Care must be taken to prevent drop foot. The sheets should be left loose over the foot of the bed and the patient's feet should be kept at a right angle to the leg at all times, either by a footboard, a posterior splint, or a half-shell plaster cast. These patients must have a 90° dorsiflexion of the foot at the ankle in order to be fitted properly with braces and shoes for gait training.

A simple but valuable procedure in the postoperative management of the paraplegic is early standing through the use of the tilt board. With the use of this board, as soon as it is orthopedically safe, the complications caused by prolonged bed rest can be avoided and urinary complications minimized.

In conclusion, with proper management from the time of injury, many of the complications frequently associated with traumatic paraplegia can be prevented, or their effects mitigated.

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THE Q-Tc, AN AID TO THE DIAGNOSIS OF RHEUMATIC CARDITIS

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THE Q-Tc (Q-T interval corrected or K) is the electrocardiographic measurement of the duration of the Q-T interval, corrected for heart rate.

The Q-T interval is measured from the beginning of the Q wave to the end of the T wave. There are several formulas[1-3] for correcting the measured Q-T interval for rate. The most commonly accepted is Bazett's formula.[3] He related the measured Q-T interval to the square root of the cycle length. This formula can be expressed as follows:

$$\text{Q-Tc (K)} = \frac{\text{Q-T interval}}{\sqrt{\text{cycle length}}}$$

FACTORS AFFECTING THE Q-Tc

The duration of the Q-Tc is affected by many factors (table 1). Exercise and excitement have been shown by Taran and Szilagyi[4] to prolong the Q-Tc. This is particularly important in that falsely elevated determinations may be obtained. The electrocardiogram should be taken at basal conditions of physical and emotional rest.

Hypertension, congestive heart failure, heart enlargement, and myocardial infarction have been shown to prolong the Q-Tc.[5] This has been explained by various authors on the increased length of the cardiac fibers and secondary inefficient oxygen consumption.[6]

Tung[7] studied 14 cases of massive tuberculous pericardial effusion and found that the Q-Tc was below the upper limits of normal. He concluded that this would be an important point in differentiating massive effusion from cardiac dilatation. Taran and Ordorico[8] presented 13 cases of rheumatic pericarditis and

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found that the Q-Tc was within normal limits in 12. The Q-Tc became prolonged after the initial episode of pericarditis cleared and the predominant manifestation was rheumatic carditis.

TABLE 1. *Factors that affect the duration of the Q-Tc*

Types of factors	Prolonging Q-Tc	Shortening Q-Tc
Physiologic	Exercise Excitement	
Cardiac	Hypertension Congestive failure Heart enlargement Rheumatic carditis Intraventricular heart block Myocardial infarction "Dying heart"	Pericarditis Prolonged P-R interval and A/V dissociation in rheumatic carditis
Drug therapy	Quinidine Emetine	Digitalis Salicylates Oxygen Cortisone
Metabolic	Hypocalcemia Hypokalemia	
Miscellaneous	Illuminating gas poisoning Pulmonary embolism	

The literature on the usefulness of the Q-Tc in rheumatic fever has been controversial. There is no unanimity of opinion on the technic of measurement, the selection of cases, and the upper limits of normal. The technic has included determining the Q-Tc in lead II,[9] in the lead with the highest T wave,[10] or obtaining an average of many leads.[11] The activity of the disease process in various group studies has been inconsistent. There is no agreement on the upper limits of normal.

Katz,[12] White and Mudd,[13] and Dock[14] stated that the Q-Tc is of little or of no clinical value. Solomon and Zimmerman,[15] Weinstein and associates,[16] and Abrahams[10] found evidence that the Q-Tc was prolonged in active rheumatic fever. Taran and Szilagyi[11] studied 50 normal children and 50 children with acute rheumatic carditis and found that there was almost complete correlation of a prolonged Q-Tc in the carditis group and of a normal Q-Tc in the control group. They also showed in another study[17] of 123 patients followed for a period of one year and of an additional 17 patients followed for a period of four years that the

Q-Tc could be related to prognosis. The patients with greater prolongation of the Q-Tc, elevated over the longest period of time, developed increased valvular defects and progressive heart enlargement. Conversely, patients with a Q-Tc that approached normal, and in which the Q-Tc remained elevated for a shorter period of time, developed little or no cardiac damage.

Digitalis[13] has been found to shorten and quinidine[14] to prolong the Q-Tc. Salicylate therapy,[4] oxygen,[18] and cortisone[19] affect the duration of the Q-Tc; therefore, therapeutic measures must be considered in its evaluation.

The Q-Tc is modified by electrolyte imbalance, particularly changes in the calcium and potassium levels. Hypocalcemia prolongs the Q-Tc and this may have clinical significance in unrecognized calcium deficiencies.[20] The work of Bellet and Finkelstein[21] on potassium deficiency was an important contribution. This has been particularly useful in the treatment of diabetic acidosis and coma.

Other conditions that can cause prolongation of the Q-Tc are intraventricular heart block,[12] emetine therapy,[22] illuminating gas poisoning,[21] pulmonary embolism,[21] and the "dying heart."[21]

TECHNIC OF DETERMINING THE Q-Tc

Taran and Szilagyi[23] have written several articles on the measurement of the Q-Tc. In these articles, they stress important points in differentiating the diphasic T, T-U fusion, T-P fusion, and inverted U waves. The importance of taking numerous measurements in many leads is stressed. This is demonstrated in tables showing the margin of error in 3 cycle, 8 cycle, 12 cycle, and all cycles per minute determinations. It was concluded that the most practical method with an acceptable margin of error was a minimum measurement of six leads of six seconds each. The leads used in their study were 1, 2, 3, and CF2, CF4, and CF5.

MATERIALS AND METHODS

It was the purpose of this study to determine whether the Q-Tc had value as an aid in the diagnosis of rheumatic carditis in young men. We selected 25 normal airmen between the ages of 17 and 25, who had no past history of heart disease and in whom auscultation of the heart and roentgenograms of the chest were normal. These were used as controls. Electrocardiograms were obtained from 32 male patients with proved rheumatic disease of comparable age who fulfilled Jones'[24] diagnostic criteria. Only electrocardiograms prior to therapy were used. The authors were aware of each diagnosis at the time of measurement. Because of the type of mathematical calculation involved, however, it is believed that the values obtained were not subjectively influenced.

We have interpreted only electrocardiograms taken on a string galvanometer and measured the Q-T and R-R intervals in six-second lengths in leads 1, 2, 3, and V_2, V_4, and V_6 (total - 36 seconds). The electrocardiograms were read with the aid of a magnifying glass and calipers. A Sanborn electrocardiograph ("cardiette") powered by hand winding and battery was used. The electrocardiographic machines were checked monthly for accuracy of timing.

TABLE 2. *Average Q-Tc in normal persons*

Patient	P-R interval	Rate	Average Q-T	Average R-R	Average Q-Tc
1	0.16	90	0.330	0.673	0.402
2	14	64	374	928	386
3	18	80	348	751	401
4	13	84	320	715	379
5	14	100	288	599	372
6	14	76	340	791	382
7	14	86	322	695	386
8	16	86	328	702	392
9	14	69	360	878	385
10	17	106	290	566	385
11	14	79	337	764	386
12	16	79	328	760	376
13	17	88	292	681	354
14	14	80	321	756	369
15	15	65	364	922	380
16	17	77	350	784	395
17	14	70	364	853	394
18	13	80	328	752	379
19	16	79	332	762	380
20	16	75	333	808	371
21	12	100	284	602	368
22	13	94	320	643	397
23	13	84	335	714	396
24	19	90	318	667	390
25	16	75	348	803	389
Average	0.15	85			0.384

RESULTS

The data obtained from the normal control group is summarized in table 2. The P-R interval varied from 0.12 to 0.19 second (average 0.15). and the rate from 65 to 106 (average 85). The Q-Tc ranged from 0.354 to 0.402 (average 0.384).

TABLE 3. *Average Q-Tc in rheumatic patients*

Patient	P-R interval	Rate	Average Q-T	Average R-R	Average Q-Tc
1	0.15	75	0.376	0.803	0.420
2	22	92	384	658	470
3	22	84	380	717	447
4	15	88	348	685	424
5	19	63	424	949	436
6	16	100	356	604	458
7	21	78	386	770	440
8	15	78	362	762	415
9	16	70	376	860	406
10	21	58	408	1.030	401
11	20	85	354	725	416
12	20	76	372	797	417
13	19	90	341	665	419
14	18	128	312	470	456
15	18	68	388	880	415
16	22	88	340	678	413
17	18	99	338	605	430
18	12	93	340	645	423
19	18	104	320	579	421
20	20	75	388	826	428
21	20	92	352	646	439
22	18	100	338	605	430
23	17	52	460	1.115	440
24	18	99	336	605	432
25	16	77	390	780	441
Average	0.17	85			0.429

The data obtained from the rheumatic group (table 3) shows that the P-R interval (excepting in those patients with a P-R interval of 0.24 second or above) ranged from 0.12 to 0.22 second

(average 0.17 second). The rate varied from 52 to 128 (average 85), and the Q-Tc ranged from 0.401 to 0.470 (average 0.429).

The data obtained from the rheumatic group with P-R prolongation of 0.24 second and above or with auricular-ventricular dissociation is summarized in table 4. The P-R interval varied from 0.24 to 0.42 second (average 0.29 second), the rate varied from 63 to 98 (average 73), and the Q-Tc ranged from 0.383 to 0.417 (average 0.395).

TABLE 4. *Average Q-Tc in rheumatic patients with P-R intervals of 0.24 second or above and with A/V dissociation*

Patient	P-R interval	Rate	Average Q-T	Average R-R	Average Q-Tc
1	0.31	68	0.364	0.883	0.386
2	A/V	86	328	695	394
3	42	70	368	860	383
4	24	98	308	610	394
5	24	64	404	934	417
6	24	63	394	950	404
7	A/V	68	365	872	390
Average	0.29	73			0.395

DISCUSSION

Comparison of the Q-Tc with the P-R interval in 32 patients with acute rheumatic fever is made in figure 1. In the seven patients with either auricular-ventricular dissociation or a P-R interval of 0.24 second or over, it was noted that five fell in the range below 0.400, one in the range 0.400 to 0.410, and one in the range above 0.410. It is our opinion that, in suspected rheumatic fever patients with these findings, the Q-Tc is of doubtful value.

In figure 2 we have plotted the values of the Q-Tc obtained from an average of six leads in 25 normal controls and 25 rheumatic patients, excluding the seven patients with auricular-ventricular dissociation and P-R prolongation of 0.24 second and above. There was slight overlap in the range from 0.400 to 0.410. Most of the cases (92 percent of the controls and 92 percent of the rheumatic fever patients) fell outside this range. No person in the control group had a Q-Tc higher than 0.410 and no patient in the rheumatic fever group had a Q-Tc less than 0.400.

We have accepted 0.400 as the upper limits of normal for the Q-Tc in young adults. The range from 0.400 to 0.410 must be

considered equivocal. The presence of a Q-Tc greater than 0.410 in a patient suspected of having acute rheumatic fever would seem to substantiate the clinical impression.

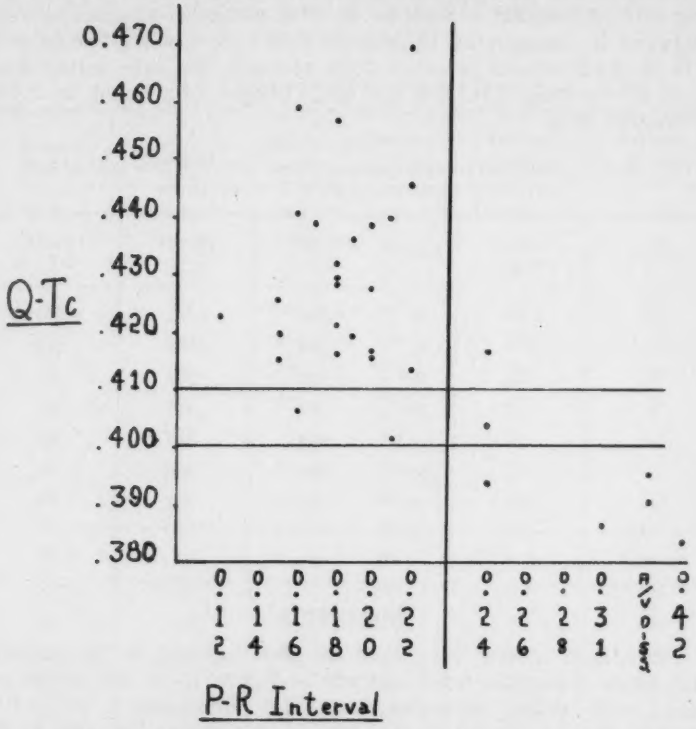

Figure 1. The Q-Tc compared with the P-R interval in rheumatic fever patients.

It is our opinion that the Q-Tc is valuable as an aid in the diagnosis of rheumatic carditis in young adults when the following criteria are observed: (1) The patient should be at basal conditions when the electrocardiogram is recorded. (2) Photographic electrocardiograms rather than directly written electrocardiograms should be used. (3) The Q-T should be measured with the aid of magnifying glass and calipers in six leads of six seconds each and an average taken. (4) Drug therapy, auricular-ventricular dissociation, prolonged P-R interval, and pericarditis are factors which must be considered in evaluating the Q-Tc.

SUMMARY

The Q-Tc is the electrocardiographic measurement of the duration of the Q-T interval, corrected for rate.

The Q-Tc was determined on the electrocardiogram prior to therapy in 32 patients with proved rheumatic fever and compared with the Q-Tc obtained from 25 normal controls. It was found that 0.400 could be accepted as the upper limit of normal, 0.400 to 0.410 as equivocal, and above 0.410 as prolonged. The presence of a Q-Tc greater than 0.410 in a patient suspected of having acute rheumatic fever substantiates the clinical impression.

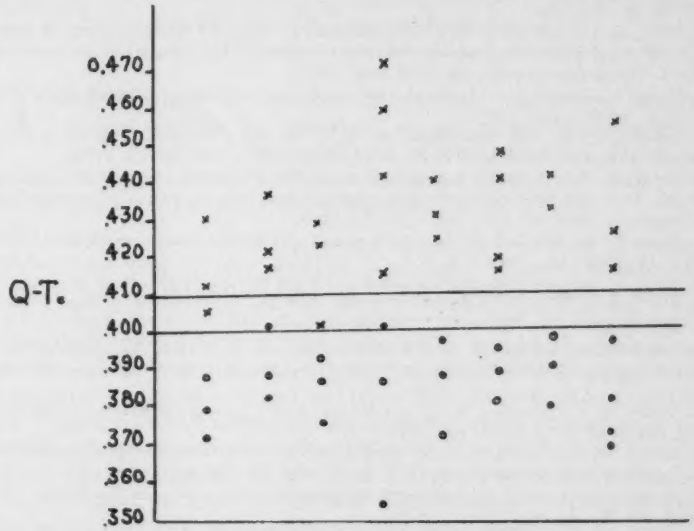

Figure 2. Average Q-Tc in normal persons (o) *and rheumatic fever patients* (x).

The Q-Tc in patients with proved rheumatic fever with a prolonged P-R interval (0.24 second or longer) or auricular-ventricular dissociation was within normal or equivocal limits in six or seven instances.

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FRANKFORD ARSENAL RECEIVES HEALTH CERTIFICATE

Frankford Arsenal in Philadelphia, one of the Army Ordnance Corps' largest industrial establishments, was recently awarded the Certificate of Health Maintenance of the Occupational Health Institute for providing its employees with "the best kind of constructive health service, aimed at keeping workers well and cutting the incidence of accidents and disease." The certificate was presented to Brigadier General Joseph M. Colby, USA, the Commanding Officer by Dr. Glenn S. Everts, regional consultant of the Occupational Health Institute which is a nonprofit organization. Dr. Laurence P. Develin is medical director of the arsenal.

COLD INJURY TREATMENT CENTER IN KOREA

Report of Operations During Winter of 1952-1953

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CARL N. EKMAN, *Lieutenant Colonel, MC, USA*

THROUGHOUT the history of warfare, casualties resulting from exposure to extremes of environmental temperature have hampered the operation of armies in the field. The United Nations forces in Korea have added further chapters in the struggle to overcome these hazards.

The winter of 1950-1951, characterized by extreme operational difficulties due to the sudden onslaught of the Chinese communist forces, saw upwards of 5,000 injuries due to cold injury.[1] Only about 1,000 such injuries occurred in the winter of 1951-1952, because of a more stabilized tactical situation and an extensive cold weather injury program.[2] This program was continued during the winter of 1952-1953 and all components of the United Nations forces in the Eighth United States Army were directed to evacuate patients with cold injuries to this hospital, which was designated as the Cold Injury Treatment Center. The single exception was the British Commonwealth division which elected to treat its own patients with cold injuries.

During the period covered by this report a total of 290 patients with cold injuries were reported from the Eighth United States Army and 46 from the Korean Communications Zone, making a total of 336 patients for all of Korea. This report concerns itself with an analysis of the 286 patients who were treated at this hospital. Detailed information for evaluation of the remaining patients is not available to us; however, it is believed that because the patients included in this article are almost entirely from combat units where opportunity for severe cold injuries is maximum, whereas those not included are mainly from rear-area units, the exclusion of the latter group would not alter the general impression that cold injuries in Korea during the winter of 1952-1953, when compared with previous winters, had markedly decreased in severity.

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1. From 48th Surgical Hospital, Eighth United States Army, Korea.

Because no surgical facilities were in operation at this hospital, patients with cold injuries and major wounds or those requiring surgical intervention were routed through normal evacuation channels to units having surgical facilities.

All patients admitted to this hospital were graded as to distribution and degree of injury. When surgical intervention became necessary, patients were evacuated. The remainder were treated according to precepts which have been discussed by Orr and Fainer.[3] Patients were returned to duty with their units as soon as they were physically fit.

A total of 286 patients with cold injuries were admitted to this hospital between 3 December 1952 and 22 March 1953. Of these 286 patients, 281 had frostbite; that is, actual freezing of the tissues resulting in local changes ranging from transient vasomotor phenomena to extensive necrosis. Five patients had trench foot; that is, deterioration of tissues caused by restriction of blood flow to the feet when exposed to moisture and cold.

CRITERIA

Grading of intensity of involvement followed classical divisions.[3, 4] (1) First-degree injury consists of transient vasomotor phenomena (*i. e.*, ischemia followed by erythema and mild edema). Subjective sensations such as numbness, tingling, itching, burning, and occasionally aching pain of the affected part are observed. These signs and symptoms disappear within one week. (2) Second-degree injury is manifested by intensification of these signs and symptoms. In addition, it is accompanied by the formation of vesicles that *do not* involve the entire thickness of the skin. (3) Third-degree injury shows involvement of the entire skin thickness and extends to varying depths into the subcutaneous tissues. (4) Fourth-degree injury produces damage to all tissues of the part, including bone, and results in loss of the part.

Data pertaining to the winters of 1950-1951 and 1951-1952 were obtained from the preventive medicine division of the surgeon's office, Eighth United States Army, Korea. Data pertaining to the winter of 1952-1953 were obtained by analysis of hospital records at this hospital.

DISTRIBUTION BY DEGREE OF INJURY

Of about 5,000 patients observed during the winter of 1950-1951, the great majority had second- and third-degree injuries, but a considerable number showed fourth-degree injuries (table 1). Severe involvement resulted in few amputations but prolonged hospitalizations. Of the 1,010 patients observed during the winter of 1951-1952 only about one fourth had third- and fourth-degree injuries. Thus, with a great decrease in total incidence there was also a pronounced trend toward less severe involvement

(table 1). Of the 286 patients with cold injuries admitted to the Cold Injury Treatment Center during the winter of 1952-1953, almost two thirds had first-degree and one fourth had second-degree injuries (table 1). The fact that the vast majority of these injuries were first and second degrees reflected great improvement in measures for the prevention of cold weather injuries.

TABLE 1. *Distribution of patients with cold injuries by degree of involvement (1951 to 1953)*

Year	Number of patients	Degree of injury (percent of patients)			
		1	2	3	4
1950-1951	5,000±	16.7	33.6	43.6	6.1
1951-1952	1,010	38.7	36.6	20.1	4.6
1952-1953	286*	62.3	27.0	9.6	1.1

*Observed at the Cold Injury Treatment Center.

TABLE 2. *Incidence of frostbite by month and degree of involvement*

Month	Number of patients	Degree of involvement			
		1	2	3	4
December 1952	153	109	29	13	2
January 1953	78	38	30	10	0
February 1953	46	27	16	3	0
March 1953	4	1	1	1	1
Total	281	175	76	27	3

One of the factors involved was a well-stabilized tactical situation permitting better housing and supply of troops as well as a more vigorous enforcement of measures which each soldier could take to avoid becoming a cold-weather casualty. These measures include the wearing of sufficient clothing to keep the body warm but at the same time to avoid overheating with resultant moisture due to perspiration; avoiding prolonged exposure of unprotected skin surfaces to extreme cold; keeping the feet clean, dry, and as warm as possible; and stimulating the circulation to the extremities by exercise or massage at frequent intervals, and eliminating all restrictions which retard the circulation. In addition, commanding officers need to make certain that sufficient clothing, including special items such as the insulated rubber combat boot

developed by the Quartermaster Corps, warming enclosures, and clean, dry socks, are available to enable their personnel to carry out this program.[2]

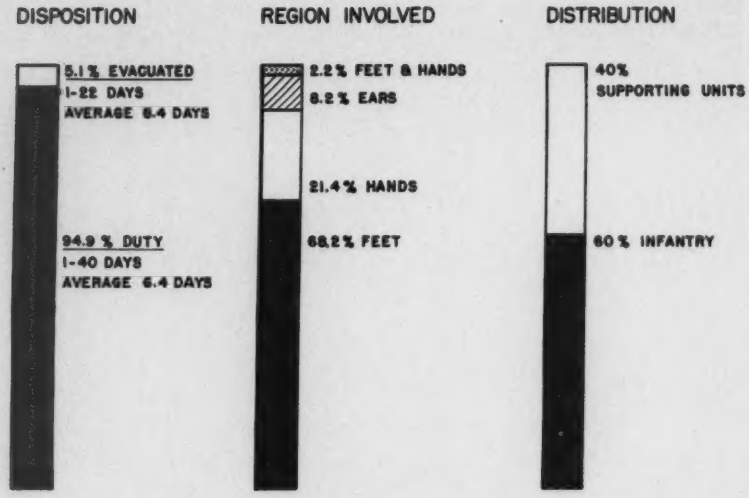

Figure 1. Statistical distribution of 175 patients with first-degree frostbite during the winter of 1952-1953.

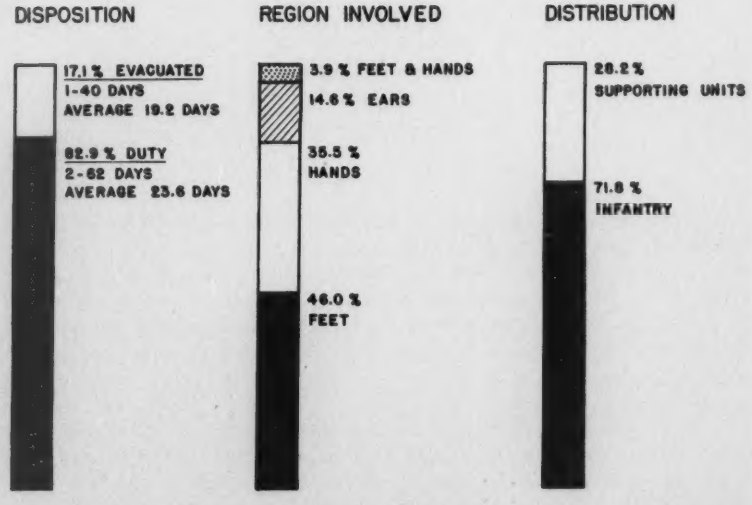

Figure 2. Statistical distribution of 76 patients with second-degree frostbite during the winter of 1952-1953.

REGION INVOLVED AND DISPOSITION

Table 2, a breakdown of degree of involvement by months during the winter, reveals that the greatest total incidence of all types of injury except that of the second degree was at its peak during the first month in which cold injuries occurred. The decrease in incidence as the winter progressed may well have been due to an increased enforcement of cold weather discipline.

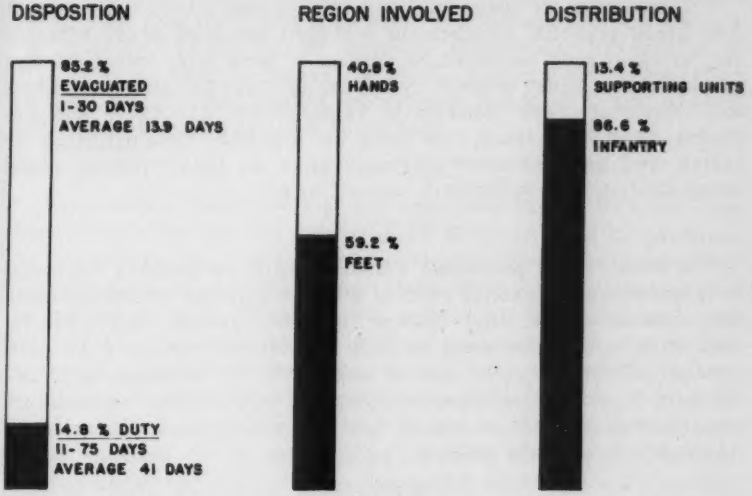

Figure 3. Statistical distribution of 27 patients with third-degree frostbite during the winter of 1952-1953.

Figures 1, 2, and 3 graphically present the final disposition, the body region most severely involved, and distribution by activity of patients with first- second- and third-degree frostbite observed in the winter of 1952-1953. The term "evacuation," as here employed, means transfer to another medical installation for surgical intervention or for prolonged hospitalization. The term "duty" indicates that it was possible to return these patients to their unit with a temporary "3" profile, pending re-evaluation at a later date. No exact data are available, but it is our belief that patrol duty was the tactical activity which gave rise to the highest incidence of cold weather injury.

Fortunately, only three patients with fourth-degree injury were observed, and all were evacuated for surgical treatment within two, 10, and 22 days.

Seventy-four patients were admitted to this hospital in the winter of 1952-1953 with the diagnosis of frostbite which was not substantiated. Over 60 of these were classified as unconfirmed

frostbite and quickly returned to duty. The rest had miscellaneous conditions including Raynaud's syndrome, acrocyanosis, and skin affections due to improper use of cold-weather gear. Only three were transferred to psychiatric installations for evaluation of emotional aberrations motivating the formation of their symptoms.

TREATMENT

The treatment of these patients was essentially conservative.[3] The basic plan for management included exposure of the affected part to air at room temperature, control of secondary infection, and prophylaxis against tetanus by a booster injection of tetanus toxoid. Vesicles were allowed to rupture spontaneously, and débrided when necessary. As soon as feasible, rehabilitation by active and passive exercise was begun so that soldiers could return to duty with a minimum loss of time.

CONCLUSIONS

The data herein presented demonstrate a tremendous decrease in incidence and severity of cold weather injuries in Korea. Factors contributing to this change included tactical stabilization with attendant improvement in troop shelter and supply, rigid cold weather discipline, and use of improved cold weather gear developed by the Quartermaster Corps. Conservative methods of management resulted in return to duty, with minimum time loss, of the majority of the patients.

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ACUTE RENAL FAILURE

We do not yet know with certainty how the lesions of acute nephrosis are produced, nor have we a clear understanding of the mechanism by which anuria results. The patient who develops acute renal failure is clearly in a state of extremely complex physiologic derangement. It is difficult (or perhaps impossible) to reproduce this state exactly in experimental animals, whose metabolic adjustments may be made in quite different ways from those of the human.

—DOUGLAS WAUGH, M. D., M. Sc., Ph. D.
in *American Journal of the Medical Sciences*, p. 322, Sept. 1953

DIAGNOSIS AND MANAGEMENT OF EPILEPSY IN THE MILITARY SERVICE

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IN THE diagnosis and management of epilepsy in the military setting certain factors such as motivation, evacuation of patients long distances for study, and eligibility for return to duty are of considerable import, and create problems usually not encountered by civilian physicians.

DIAGNOSIS

The history should be elicited both from the patient and from those who witnessed his seizure. The patient should be questioned concerning aura, seizure, and postconvulsive phenomena. Frequently the aura is either nonexistent or forgotten. There should be no recollection of the actual seizure. It is pertinent to establish this point carefully with service personnel, for if they remember details of their convulsions, they likely are having hysterical rather than epileptiform seizures. Often, feelings and actions during an hysterical fit can be described, but complete amnesia for an epileptiform seizure is typical. Postconvulsive data may also provide diagnostic clues. Was the patient soiled when he awoke? Did he injure himself in any way? Were his muscles sore and stiff the next day?

The examiner should determine the alcoholic intake and the emotional status prior to the convulsion. Alcohol lowers resistance to seizures, and its use often precedes the first convulsion in military personnel. Less well-appreciated is the tendency for emotional disturbance to trigger seizures. Tension and anxiety do not seem as important in their production as do hostile and resentful feelings which the patient is unable to relieve. For example, one of our patients was hospitalized because of seizures that occurred three or four times a year. His attitude during hospitalization, which was against his wishes, was extremely immature and resentful because he was not allowed to return to duty. When military discipline forced him to face this reality, his response was to have two dozen seizures in less than a month. Another patient, though making an adequate service adjustment,

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had been smoldering inwardly for two weeks prior to his only seizure because his parents had refused to send him his savings to invest, somewhat foolishly, in a new car.

A past history of head injury, meningitis, petit mal epilepsy, or venereal disease is important, as is a family history of convulsions.

Usually, the most significant information is obtained from witnesses of the seizure. This is especially important in the military service, because a patient may be hospitalized for study thousands of miles from the site of his convulsion and from eyewitnesses. If the medical officer of the remote station or ship records all pertinent information derived from a face-to-face interview with an eyewitness, he will perform what is perhaps the most important diagnostic study in the patient's work-up. Neglecting the collection of this information is the most serious handicap in referral of patients hospitalized for study.

The physical examination is usually negative in idiopathic epilepsy. It should be painstakingly performed, however, to rule out local neurologic signs, carotid sinus sensitivity, hypocalcemia, and sources of brain emboli such as rheumatic heart disease. Psychiatric evaluation is essential. The immature, hostile young draftee may well have hysterical seizures. On the other hand, convulsions occurring in a well-adjusted person whose history is free of enuresis, poor school adjustment, family divorce and alcoholism, service disciplinary offenses, and the like are more apt to be true epileptiform seizures.

Laboratory studies should include, in all cases, a lumbar puncture, roentgenograms of the skull, and an electroencephalogram. The child with a febrile convulsion who does not have a lumbar puncture may return 24 hours later with unmistakable signs of meningitis. The adult in whom roentgenograms of the skull are not made may have a meningioma that is obvious on roentgenographic studies. Regarding the electroencephalogram, it is important to remember that a routine tracing, without hyperventilation, metrazol, and photic or other stimuli, may be negative in epilepsy. Even with stimulation about 20 percent of epileptics will have negative electroencephalograms at the onset of their seizures.

MANAGEMENT

In the management of the acute seizure the physician has certain obligations:

1. Prevention of injury to the patient.

2. Avoidance of panic among bystanders. Witnesses should be assured that all is under control and should be dispersed after it is determined that they will be available later for questioning.

3. Observation of the seizure and postconvulsive state. Localized seizure discharges may be manifested by deviation of the head to one side, onset of seizures on one side, and so on. One should determine if the convulsion is hysterical in nature; sensitivity to pain, hyperventilation, bizarre and aggressive behavior, or quick recovery are usual concomitants of emotional fits.

4. Treatment of contributing factors; for example, in febrile convulsions and seizures secondary to acute nephritis, or toxemia of pregnancy.

5. Anticonvulsant medication. This need be given only to the patient in status epilepticus.

LONG-TERM TREATMENT

Which patient should receive long-term treatment? One seizure does not make this mandatory, but the serviceman should be observed for further difficulty before a final diagnosis of epilepsy is made and long-term treatment recommended. The drugs of choice for grand mal epilepsy are diphenylhydantoin sodium (dilantin sodium) and phenobarbital. They may be given together if seizures are frequent. With infrequent seizures either drug can be started alone. Toxic effects of diphenylhydantoin sodium include hirsutism, gum changes, gastric irritation, dermatitis, and cerebellar signs. Medication should be given after meals to avoid gastric difficulty. Daily gum massage is recommended. The skin and cerebellar signs will frequently clear up if medication is stopped for several days and then resumed.

An important point to remember with diphenylhydantoin sodium is that it has a cumulative action. For this reason it is not used alone for the emergency treatment of status epilepticus, and doses omitted because of forgetfulness during long term treatment should be made up. Phenobarbital, on the other hand, works rather quickly. It can be given at times of the day during which most patients are more susceptible to seizure, for example, at bedtime. It is probable that many epileptics can tolerate a moderate intake of alcohol, but complete abstinence is a safer course. Emotionally disturbing circumstances should be avoided if this is possible in our troubled era. Car driving, swimming alone, climbing heights, and other obviously dangerous activities are contraindicated. Treatment may be withdrawn slowly after three years of seizure-free therapy.

A most important consideration in treatment is careful indoctrination of the patient in the rudiments of his disease. The physician should be both optimistic and realistic in his explanations. Much can be done by giving the patient literature suitable for lay consumption. It is often helpful to introduce the patient to a well-controlled epileptic who has made an adequate emotional adjustment to his disorder. A long-term plan should be outlined to the patient, making it clear to him that he must continue taking medication for years, rather than for days or weeks. He should be encouraged to ventilate his feelings concerning his disease so that prejudices and undue fears can be allayed. Patients are frequently relieved to find that deterioration in the well-treated epileptic is uncommon, and that the chances of his children developing epilepsy are slim if he marries a non-epileptic.

Many errors occur in the treatment of status epilepticus, the most frequent of which is the repeated administration of large doses of barbiturates, to the point of intoxication. Recommended management is the intravenous administration of 0.2 gram of phenobarbital sodium, repeated at 20-minute intervals for three doses. If that fails, ether by drop may be started. It is important to treat contributing causes in status epilepticus, such as fever in febrile convulsions.

Surgical treatment is mandatory in cases of brain tumor or subdural hematoma. Surgical intervention may also be advisable in posttraumatic epilepsy if the diagnosis is supported by clinical, electroencephalographic, and air studies, if seizures are focal, and if a medical regimen has failed to control the seizures. Operation should be considered only when there are excellent facilities available.

What should be done about the epileptic in military service? It is best to adopt the rule that no epileptic should be retained in service. There will be occasional rare instances, however, in which individualized exceptions can be made to this rule.

SUMMARY

In outlining the diagnosis and management of epilepsy, several useful points of procedure have been emphasized, including the careful questioning of eyewitnesses and recording of all pertinent data; the distinguishing of conversion seizures in military personnel from true epileptiform seizures; and the education of the patient in how to live with his disease.

ABDOMINAL PREGNANCY

A Review and Case Report

HOWARD HORNER, *Captain, MC, USA*
HAROLD E. HARRISON, *Colonel, MC, USA*

ABDOMINAL pregnancy is one of the most interesting but, unfortunately, one of the most hazardous complications of pregnancy; although rare, it must be kept in mind, otherwise correct diagnosis will frequently be missed. Torpin[1] stated that the presence of vaginal spotting and unexplained abdominal pain in a pregnant woman should suffice to put the clinician on guard, and a pregnancy with these signs should be considered extrauterine unless proved otherwise.

An abdominal pregnancy can be either primary or secondary, the latter being the usual.[2] Studdiford[3] reported a case of primary abdominal pregnancy in 1942 which was well-documented. A similar case reported by Bourgeois[4] fulfilled the criteria of primary abdominal pregnancy as outlined by Best;[5] however, most of the cases of abdominal pregnancy, Latzko's[6] opinion to the contrary, are secondary to a tubal pregnancy which either ruptured or aborted spontaneously into the free peritoneal cavity.[7] Usually, after tubal rupture has occurred, there will not be a complete separation of the trophoblastic attachment, but rather a slow extension through the defect of the tubal wall with implantation over the surrounding peritoneal or visceral surfaces. Sometimes there is complete abortion of the ovum and de novo implantation. Only this mechanism can explain the remote locations where abdominal pregnancies have been found. One of the most unusual sites of an abdominal pregnancy, and the only one of its kind described in the literature, was in a patient, reported by Kushner and Dobrzynski,[8] in whom the placenta in its entirety was attached to the spleen.

The incidence of abdominal pregnancy has been variously quoted. Cross and associates[9] of Atlanta, Ga., reported 19 cases in 41,941 deliveries, or an incidence of one in 2,207. Bowen,[10] of French Hospital, New York, N. Y., reported an incidence of one in 17,173, which concurs with Eastman's[11] figure of one in 15,000, Douglass and Kohn's[12] estimate of one in 16,000, and Quilliam's[13] estimate of one in 12,500. Barrett[14] added five cases seen at

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the Decatur General Hospital in Decatur, Ala., to two cases previously reported by Burleson and Bragg[15] from the same institution, making the unusual incidence of abdominal pregnancy at that hospital in the period from 1947 to 1952 of one in 286 deliveries.

Because abdominal pregnancy is usually a sequela to a tubal pregnancy, and because the incidence of extra-uterine gestations is much more common in Negroes, it is not surprising to find late extra-uterine gestations to occur predominantly in them. According to Douglass and Kohn the incidence ratio of Negro to white is 16 to one. Bates and Nabors[16] reported 107 extra-uterine pregnancies, including eight abdominal pregnancies, of which 76.6 percent were in Negroes. Hazlett[17] reported a rare case of a repeated abdominal pregnancy in a young Negro patient who carried both pregnancies to term. In contrast, Lester and associates[18] reported a second abdominal pregnancy in a white patient with an associated uterus bicornis unicollis. Since the Fallopian tubes at laparotomy appeared relatively free of pathologic changes, they believed this might possibly be a primary abdominal pregnancy.

It cannot be overemphasized that a carefully taken history is one of the most important diagnostic aids. A thorough interrogation of the patient concerning the character of her last "normal" menstrual period, comparing it with previous periods, will reveal the fact that it actually was not a normal period at all as the patient had presumed, but was vaginal bleeding associated with an ectopic pregnancy. This, plus pelvic or lower abdominal pain which usually is the presenting complaint should put the clinician on the alert. Because there is considerable peritoneal irritation, the patient will frequently consult the doctor for a multiplicity of vague complaints which, at first, might seem to have no relationship to the gestation. In addition to abdominal pain the patient may complain of nausea and vomiting, flatulence, constipation and diarrhea to a varying degree, and urinary difficulties. Later in pregnancy fetal movements may be very painful.

On physical examination, the finding of a definite displacement of the cervix is an important sign that the pregnancy is abnormal. Other helpful findings are the presence of a high or transverse position of the fetus, evidence of fetal death, the presence of an extra-uterine mass, inability to ballot the fetus, failure of cervical effacement and dilatation, episodes of spurious labor, and asymmetric abdominal enlargement. Murless and associates[19] believed that the status of the cervix with its high position and failure to efface and dilate with false labor is of great significance. According to Cross and associates the other diagnostic criteria which are often mentioned but which have been of little

help to them in arriving at a correct diagnosis are the following: abdominal crisis early in pregnancy, palpation of superficial fetal parts, unusually loud fetal heart tones, inability to palpate the round ligaments, inability to palpate Braxton-Hicks contractions, and proof that the uterus is empty by probing, and, finally, by hysterograms.

Lazard,[20] and Vilalta[21] believed that the use of contrast media is of considerable aid in confirming the diagnosis once the clinician's suspicion has been aroused. For this reason this procedure has been used in the patient to be reported.

Certain laboratory and diagnostic tests are of help. Colvin and McCord[22] described the use of pituitary extract to identify an abdominal mass as separate from the uterus. A small amount of pituitary extract is injected subcutaneously while a bimanual examination is performed. A firmly contracted and thus easily recognizable uterus will permit the identification of any other extra-uterine abdominal tumor. Although well-conceived, in practice this test is not easily carried out. Roentgenograms may reveal signs which may be of help in the diagnosis of abdominal pregnancy, although none are pathognomonic. In the case to be presented the roentgenologic diagnosis was questionable. The following criteria are looked for: (1) abnormal position of the fetus; (2) presence of a pelvic mass, *i. e.*, uterine shadow; (3) fetal parts visualized immediately beneath the abdominal wall; and (4) absence of uterine shadow around the fetus. Frequently the latter finding is absent because the fetal sac usually has attained such thickness that on a roentgenogram it will commonly mimic the uterine outline about the fetus.[23] Even with the most carefully taken history and physical examination, aided by laboratory studies, the condition was diagnosed correctly before operation in only 35 percent of the patients reviewed by Cornell and Lash.[24]

Fetal salvage in abdominal pregnancy is extremely poor. In a review of abdominal pregnancies reported by Beacham and Beacham[25] in 1946 the fetal mortality was 85 percent. Ware[26] analyzed 247 cases of extra-uterine pregnancy found in the literature from 1933 to 1946. There were 251 infants in his series, of whom 140 died undelivered and 50 within the immediate neonatal period, giving a total fetal mortality of 75.6 percent. Some investigators, such as von Winckel,[27] Bland and Montgomery,[28] and Eastman,[11] also believed that these infants show a greater incidence of congenital malformations than normal intra-uterine gestations. According to Mahfouz, however, the fetuses in his series that advanced to term showed little or no abnormality, whereas some of those that died at an early age showed marked

malformations. There are occasional single case reports wherein an abdominal pregnancy terminated in a live child, a fact which only serves to emphasize the rare occurrence of this outcome.[4,30-35]

Tubal abortion usually results in an absorption of the fetus; however, once the fetus continues to grow as an abdominal pregnancy and reaches a certain size, absorption does not occur, but, rather, one of the following four alternates takes place:[11] (1) suppuration, (2) mummification, (3) calcification, (4) adipocere formation, not taking into account the rare case that is delivered as a full-term pregnancy, alive or recently dead. Because the gestation sac is in close contact with the intestines, there is frequently penetration of the former by pyogenic organisms. The resulting suppuration causes abscess formation which may rupture intraperitoneally, usually into the intestines, or extraperitoneally through the abdominal wall. In the case to be presented, had laparotomy not been decided on, perforation would surely have occurred through the abdominal wall. Mummification and calcification might have ensued; the literature contains numerous instances of a lithopedion being retained from 20 to 30 years before it was ultimately found at operation or autopsy.

Surgical intervention is the treatment of abdominal pregnancy, the only question being when to operate. The prime reason for delay of operation is to decrease the amount of hemorrhage at time of definitive surgery. Contraction and retraction of the uterine musculature causes obliteration and occlusion of the large sinuses and hypertrophied blood vessels at the site of separation of a normally implanted uterine placenta. This mechanism is absent in abdominal pregnancy where nidation is on the bowel or other visceral organs. Following fetal death, however, there is progressive diminution of the placental circulation with thrombosis and infarction, and resultant decrease in vascularity and danger of hemorrhage. Therefore some surgeons believe that an operation should be delayed in the hope that massive hemorrhages which so frequently occur at laparotomy might be prevented. Thus Champion and Tessitore[36] believed that after the fetus is dead the operation should be delayed six to eight weeks until the placental circulation has atrophied. DeLee[37] suggested deferment for seven to 20 days for the same reason, and Lull[38] postulated that if the patient's condition permits it, three to four weeks should be allowed to elapse before laparotomy, always assuming the fetus is dead when the patient is first seen. However Eastman, Ware, and others maintained that nothing can be gained by waiting and believed that surgical interference is indicated once the diagnosis is made. Moreover, Tonneau[39] and Cross and associates pointed out that this delay might actually

be hazardous because of an increased danger of preoperative infection and possible perforation of the bowel by the villous attachments, with resultant peritonitis.

Operations for abdominal pregnancy can precipitate severe and catastrophic hemorrhages. This is especially true if one is tempted to remove the placenta and thereby open up distended and hypertrophied sinuses and vessels without having the natural uterine contractile mechanism present for their occlusion. Only in rare instances, when there is already a partial separation present with excessive bleeding, is one justified in removing the placenta. Usually, however, one should promptly clamp the cord close to the placenta and leave the latter in situ, allowing for spontaneous absorption as advocated by Beck[40] in 1919. Unnecessary explorations and elective surgery such as incidental appendectomy should be avoided. It has been shown that most patients will do better if primary closure without drainage is employed, with resultant decrease in the patient's postoperative morbidity and shorter convalescence. Adequate amounts of cross-matched blood should be available at operation and used as indicated. To avoid infection, it is advisable to use antibiotic agents prophylactically, preoperatively as well as postoperatively.

What happens to the placenta that is left behind? Usually it is absorbed completely without temperature elevation or other morbidity. Sometimes, however, the postoperative course is not benign and complications may ensue. Adhesions can form which may lead to intestinal obstruction. Peritonitis and infection with possible abscess formation and prolonged drainage through an abdominal fistula or into the cul-de-sac may occur, or the patient may complain of a persistent pain, finally necessitating reexploration at a later date, with removal of the offending placental tissue. Serious and troublesome as these complications might be, still they are of less consequence and not as life-threatening to the patient as an uncontrollable hemorrhage following the attempted removal of the placenta during the first operation. Branscomb[41] reports a case where seven months after the operation the retained placental mass was the size of a six months' gestation. MacGregor[42] cited a case where an orange-sized mass was still present at the end of 16 months. Mason,[43] Jewett,[44] and Studdiford[45] saw patients in whom a residual mass was found many months or even years after the primary operation. Yet the important fact to bear in mind is that none of these patients were complaining of any abdominal discomfort.

The seriousness of abdominal pregnancy will be appreciated when one considers the high maternal mortality which accom-

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panies that condition. In Ware's series of 13 late extra-uterine pregnancies it was 30.76 percent, and in the 249 cases he found in the literature since 1933 and which included his 13 cases it was 14.85 percent. Cornell and Lash reported a 14.3 percent maternal mortality rate, half of which was due to shock alone. Peritonitis, intestinal obstruction, toxemia, pyelonephritis, and a miscellaneous group accounted for the other 50 percent. In Jarcho's[3] series the death rate was 11.1 percent. Bland and Montgomery reported a 34.7 percent maternal mortality rate for 240 cases of late extra-uterine pregnancy found in the literature from 1813 to 1907, while it dropped to 16.7 percent for 61 cases collected from 1907 to 1923.

CASE REPORT

A 30-year-old Japanese woman, gravida 2 para 0 abortion 1, was admitted to the gynecologic service of this hospital on 30 October 1952 because of the presence of an intra-abdominal mass.

Present Illness. The patient's last normal menstrual period was 8 September 1951, and her estimated date of confinement 15 June 1952. On 25 September 1951 the patient developed severe lower abdominal pains which were relieved by "a shot" given by a physician. On 3 October 1951 a dilatation and curettage was performed without bleeding or removal of any products of conception (details unknown, since records were not available). One week later the patient developed a foul vaginal discharge, although she had been receiving 300,000 units of penicillin daily. On 20 October 1951 treatment was begun by another physician. The patient received fluids intravenously, five blood transfusions, and penicillin. She improved, and during the next two months was examined every two weeks and was advised she still had the baby and that the pregnancy was progressing satisfactorily. She continued, however, to have frequent right-sided abdominal pains and occasional vaginal spotting. By January 1952 there was no further vaginal bleeding, but the patient complained of frequent gastrointestinal disturbances. In March 1952 she came to the United States. She reported to an Army general hospital in 1952, and was followed in the prenatal clinic. Adequate records are available only from this time on. On 10 May 1952 she developed severe pain in the left lower side of her abdomen, with radiation to the right side. She was told she had a kidney infection and was hospitalized for four days, and was given fluids intravenously and antibiotics. On 23 May she developed "high fever" and severe lumbar pain and at this time noted no further fetal movements. She was told the fetus was not alive and that she would have to wait for spontaneous onset of labor.

There was some bleeding in June 1952, at which time roentgenograms confirmed fetal death. She was repeatedly informed that she must await spontaneous delivery and that no operation was indicated. On 26 September 1952 she started a normal period which lasted five days and then had another normal period on 26 October 1952. In October 1952 the patient's husband was transferred to the Pacific Northwest and the patient came to this hospital for evaluation.

Past History. The patient had been pregnant three years before the present pregnancy, but had aborted at four months. She had six blood transfusions in November 1950 because of vaginal bleeding. The entire history is not reliable because of the language barrier and inability to obtain old records.

Physical Examination. General physical examination findings were within normal limits, revealing a well-developed, well-nourished woman in no acute distress. The abdomen was enlarged by a tumor mass the size of a seven months' gestation. No fetal activity could be elicited and fetal heart tones were not audible. The mass was semisolid and only one fetal part was palpable. The external genitalia was normal and Bartholin and Skenes' glands were not palpable. The vagina contained a red-brown mucus. The cervix had a stellate laceration with evidence of a chronic cervicitis, but it was not displaced. The uterus was difficult to palpate, but was thought to be lying immediately anterior to the cervix, anteflexed against the anterior vaginal wall. It was about one and one-half times the normal size and fixed in position. A large, fixed tumor mass seemed to arise from the right adnexa and was compatible in size with a pregnancy of seven months. Neither ovary could be felt. The impression on admission was that the patient had an extra-uterine pregnancy with fetal death and possible mummification or calcification of the fetus. It was postulated that the September 1951 episode represented rupture of an ectopic tubal pregnancy with secondary implantation of the placenta and continued fetal growth to a period of seven-months' gestation, then fetal death and culmination in the present picture.

Laboratory Studies. Routine laboratory determinations were found to be within normal limits except for an elevated erythrocyte sedimentation rate. Roentgenograms of the abdomen revealed a fetus, but it was thought to be intra-uterine. A gastrointestinal series was noncontributory. Because of the strong clinical impression of an abdominal pregnancy, a hysterosalpingogram was done on 5 November with great difficulty, producing severe pain when the dye was injected. Review of the films was not conclusive, but they were interpreted as probably showing an extra-uterine pregnancy. The patient developed a

reaction to the dye used. It responded to the administration of epinephrine and diphenhydramine hydrochloride (benadryl hydrochloride).

Course in the Hospital. Following the laboratory procedures outlined above, the patient developed a severe infection of the products of gestation beginning on 6 November 1952 with temperature spiking to 101° to 102° for the next 14 days. Blood, cervical, urine, and stool cultures were all negative for pathogens. The patient was maintained on massive doses of antibiotics. Her condition, however, became progressively worse, with increased toxicity, and on 18 November 1952 a tender indurated mass, which had increased in size and was thought to be an abscess, was felt beneath the umbilicus. Roentgenograms revealed gas about the fetus. The patient was seen in consultation and it was believed that she had a ruptured uterus with development of an intra-uterine abscess. On 18 November 1952 under spinal anesthesia an exploratory laparotomy was done.

An infected pregnancy within an abscess cavity was found. Because of marked adhesions, necrosis, and inflammatory reaction it could not be absolutely determined at operation whether the uterus was separate from this mass or simply involved by contiguity. The abscess wall was found to be adherent to the right anterior abdominal wall, appendix, cecum, transverse colon, sigmoid, and descending colon. The adhesions were freed with considerable difficulty after the mass itself had ruptured, and about 1,000 cc. of foul, gray pus evacuated. The fetus was found to be macerated and was removed separately. With great technical difficulty a total hysterectomy and right salpingo-oöphorectomy was performed. The vaginal cuff was left open for drainage. The patient received 2,000 cc. of whole blood during the operation and 1,000 cc. of dextrose. A careful dissection of the surgical specimen confirmed the original clinical impression of an abdominal pregnancy, probably secondary to a tubal abortion, with placental implantation on the fimbriated end of the Fallopian tube.

PATHOLOGY REPORT

Gross Pathologic Examination. The specimen consisted of a uterus, cervix, tube, ovary, and a fetus. The cervix measured four centimeters in length and averaged 2.7 centimeters in diameter. The smooth epithelium of the external portion of the cervix was present in one area.

The recognized portions of the uterus measured 6 by 7 by 4.5 centimeters. Attached to the uterus was a very large sacculation and it could not be determined whether this large sacculation, which measured about 20 centimeters in length by 18 centimeters

in diameter, represented a part of an abnormally formed uterus or a greatly dilated Fallopian tube. The endometrial cavity showed no abnormal communications and the endometrium was relatively inactive, averaging 3 mm. in thickness. The serosal surface of the uterus and this sacculation showed many fibrous adhesions. The sacculation housed a fetus, fibrinated material, and a placenta.

What apparently was a Fallopian tube was recognized on the external walls of the sacculation. It measured 11 centimeters in length, up to one centimeter in diameter, and the lumen was probed. Its fibrinated extremity was not recognized and a communication between this tube and the sacculation was not recognized.

An ovary, 4.5 by 3 by 1.5 centimeters in dimension, was situated in the wall of the sacculation. Its cut surface showed old corpora lutea and tiny noncystic structures. The sacculation proper had a fibrous-type wall, and the interior was ragged and covered with fibrinous purulent exudate. The placenta, of an estimated diameter of 13 centimeters, varied in thickness up to 3 centimeters, and was very degenerated.

The fetus was that of a female measuring 40 centimeters from crown to heel and 28 centimeters from crown to rump. A macerated portion of cord attached to umbilicus measured 33 centimeters. The maceration was extreme and sections were not taken.

Microscopic Examination. The sacculation showed smooth muscle layered in two planes, with the cells oriented at 90° to each other from one plane to another. One area showed a small span of columnar epithelium where fibrosis and exudate had not obliterated detail. There was much infiltration with plasma cells and lymphocytes, and the bulk of the lining surface was necrotic. An area of luteinized stroma was noted. This stroma was not remarkable except for one area which abutted on the lining of the sacculation, and here fibrosis and exudate, as noted above, were present. The section of the body of the uterus showed the endometrium to be relatively shallow, the stroma compact, and the glands relatively straight and lined by simple columnar epithelium, with little evidence of secretory activity. Decidual cells were not present. The myometrium and serosa were not remarkable in these sections. The sections of the Fallopian tube showed considerable exudate of plasma cells and lymphocytes in the stroma under the low columnar epithelium lining the tube. The musculature of the tube was somewhat infiltrated, as was the serosa to a lesser extent. Cervical sections showed an essentially normal-appearing stratified squamous epithelium and columnar epithelium. The glands likewise were not remarkable. The stroma was infiltrated with lymphocytes, especially

under the epithelial surface and about the glands. The placenta was necrotic, hyalinized, and infiltrated with polymorphonuclear leukocytes, lymphocytes, and plasma cells. Decidual cells were not recognized. The sections of round ligament depicted a normal-appearing structure.

The diagnosis was extra-uterine, infected pregnancy on the Fallopian tube, fimbriated extremity; chronic salpingitis; chronic oöphoritis; chronic cervicitis.

POSTOPERATIVE COURSE

The patient's immediate general postoperative condition was remarkably good. She was given streptomycin, penicillin, fluids intravenously, and continuous gastrointestinal decompression using a Miller-Abbott tube with Wangensteen suction. On 27 November 1952 (ninth postoperative day) the nasal end of the tube was inadvertently cut before the tube had passed the large bowel. Although it was anticipated that the tube would pass spontaneously per rectum, there was no progression for the next 48 hours as evidenced by roentgenograms. Instead, the patient developed a partial intermittent intestinal obstruction secondary to a coiling up of the Miller-Abbott tube, and on 29 November another laparotomy was performed. The coiled tube was found in a loop of the ileum, which was distended proximal to the point of obstruction.

The patient tolerated the operation well and was returned to the ward in good condition. She was given penicillin but developed a generalized urticaria and the penicillin was discontinued. She was then given oxytetracycline (terramycin) intravenously. Decompression was accomplished by a second Miller-Abbott tube which was left in for six days. After removal of the tube normal bowel function returned, and she tolerated oral feedings well. She developed multiple superficial wound abscesses which had to be opened. After packing of the wound with plasma-oxytetracycline paste satisfactory granulation developed. She was discharged on 5 January 1953, asymptomatic and feeling well, the abdominal wound showing almost complete granulation. Pelvic examination before discharge disclosed the vaginal vault to be granulating well. A large indurated mass was felt extending from the cuff to the right lateral pelvic wall. When seen in the clinic three weeks later there was considerable resolution of this area of induration and much less tenderness.

SUMMARY

Abdominal pregnancies can be either primary or secondary; most are secondary, and are usually a sequela of tubal pregnancy. The majority of abdominal pregnancies are observed in Negro patients. Clinical aids in diagnosing this condition in-

clude a carefully taken history, evidence of vaginal bleeding and pelvic pain, displacement of the cervix, and the presence of an extra-uterine mass. The pituitary extract test and roentgenograms are also of use in diagnosis.

Maternal mortality in abdominal pregnancy is reported to be from 15 to 30 percent, and fetal mortality from 75 to 85 percent. Surgical intervention is the treatment of this condition, but because of the dangers of massive hemorrhage the optimum time for operation is a matter of controversy.

In the patient presented herein, an exploratory laparotomy about 14 months after conception and about six months after death of the fetus revealed an infected pregnancy within an abscess cavity. Because the maceration of the products of conception had involved the uterus, cervix, and right tube and ovary, total hysterectomy and right salpingo-oöphorectomy were performed. We believe that this is a case of rupture of an ectopic tubal pregnancy, with secondary implantation of the placenta and continued fetal growth to a seven-months' gestation, then fetal death.

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MITRAL COMMISSUROTOMY

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BLAND[1] credited Billroth with the sage observation in 1883, "let no man who hopes to retain the respect of his medical brethren dare to operate on the human heart." Yet as early as 1876 Klebs[2] had demonstrated an approach to the mitral valve in animals, and Rehn,[3] not heeding Billroth's advice, successfully sutured a wound of the heart in 1897. The turn of the century saw a slow steady development of interest in cardiac surgery. Brunton[4] in 1902 suggested but did not use the present-day approach to the mitral valve. This suggestion brought severe criticism from his colleagues. McCallum and McClune[5] in 1906 took the mitral problem to the laboratory and attempted to produce mitral stenosis and insufficiency in animals. Cushing and Branch[6] in 1908 reported experimental work on chronic valvular lesions and discussed the relation of their experience to further valvular surgery. Bernheim[7] and Schepelmann[8] described their animal experiments in mitral valve surgery in 1912. Doyen[9] in 1913 performed the first transventricular pulmonary valvulotomy on a 20-year-old woman who died several hours after the operation. This same year Tuffier[10] dilated the pulmonary valve through an invaginated pulmonary artery. This patient survived 10 years and was considered improved following the operation.

Cutler and Levine[11] in 1923 passed a tenotome through the left ventricle and attempted to incise the mitral valve cusps. This patient survived four and one-half years, and at death an autopsy revealed that the diameter of the mitral valve was 4 cm. This first successful valvulotomy had increased the valvular diameter, but the principles described by Brunton had not been followed. In the light of present knowledge it must be assumed that this patient undoubtedly had a postvalvulotomy mitral insufficiency. Souttar[12] in 1925 approached the mitral valve with the finger through the left auricular appendage. The patient survived, but Souttar's colleagues were not impressed by the procedure and did not send him more patients for treatment. In all, 10 patients with mitral stenosis were subjected to operation in the third decade of the twentieth century with a discouraging mortality rate of 80 percent.

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After experimental studies, Bailey[13] in 1945 did a transappendicular mitral valvulotomy, dividing the commissure with a valvulotome. Although this patient did not survive, a successful valvulotomy was reported by Harken and others[14] in 1948.

An alternate method of attack on the problem of mitral stenosis was suggested by Bland and others[15] in 1948. This method made use of a shunt between the azygos vein and the cardiac end of one of the right pulmonary veins. Such a shunt, routing blood from the pulmonary to the systemic circuit, produced a relief of the pulmonary hypertension.

In more recent years mitral valve surgery has moved into a place of acceptance. Even though the long-term results cannot yet be determined, the early response is most favorable and offers a salvation to many "cardiac cripples" suffering the consequences of mitral stenosis.

This report covers 50 patients who received surgical treatment for rheumatic mitral disease at this hospital during the years 1951 to 1954. Two operations were performed in 1951, 12 in 1952, and the remaining 36 in 1953 and the first three months of 1954.

SELECTION OF PATIENTS

The preoperative study and evaluation of patients in this report have been carried out by the cardiology section. Patients with mitral stenosis are grouped in four classes according to functional capacity.

Class I. Auscultatory evidence of mitral stenosis exists, but the patient presents no symptoms of the disease.

Class II. The patient is symptomatic, but is able to carry on normal activities with minor limitations, and there is no subjective evidence of progression of the disease.

Class III. The symptoms are progressive. There is moderate to marked limitation of activity. Auricular fibrillation, hemoptysis, and episodes of acute pulmonary congestion may or may not have occurred. These patients show a limited response to cardiac drugs and bed rest.

Class IV. The patient is severely incapacitated, bedridden, with marked symptoms. Chronic heart failure is usually well established.

Such a classification corresponds very closely to that used by the American Heart Association as well as by Harken and associates.

The cardiology section of the hospital assumed an active role in the management of the patients during operations and the im-

mediate postoperative period. A continuous electrocardiogram made during the operative procedure guided the emergency administration of indicated drugs. The long term follow-up and final evaluation of mitral valve surgery was determined by the cardiologists.

Because the mortality rate associated with mitral commissurotomy is directly related to the severity of the disease as indicated by the patient's classification, an increased mortality rate was anticipated in any series in which a large number of class IV patients receive surgical treatment. Janton and associates[16] reported a mortality rate of 5.8 percent in 274 patients. Harken and others found a mortality of 20 percent in class IV patients with an over-all mortality of three percent in the other classes. Gerbode and others[17] recorded five deaths in a series of 44 patients, a 11.3 percent mortality rate. Julian and co-workers[18] noted five deaths in 42 patients undergoing mitral valvulotomy, a 12 percent mortality rate. Griffith and associates[19] reported nine deaths in 126 patients, a mortality rate of seven percent, and emphasized that only class III and some class IV patients should be selected for operation.

Thirty-five of the patients reported in our series were in class III, 12 were in class II, and the remaining three in class IV. We have not intentionally avoided surgical intervention in class IV, but only three patients of this type presented themselves for treatment. No definite correlation was found between the functional classification and the existence of a past history of rheumatic fever. Twenty-six patients had had a history of rheumatic fever and in nine others this was questionable. Of the 50 patients in this series, 39 were women. The comparative dearth of men in this series is accounted for by the fact that mitral heart disease ordinarily disqualifies men for active military service, and because it is usually detected during physical examination at the time of induction, fewer men present themselves later for treatment of this disease. Three patients were 18 to 20 years of age; 21, 20 to 30 years; 18, 30 to 40 years; and eight were 40 to 46 years of age. This age distribution is consistent with that reported in larger series, indicating that the gradual progression of stenosis produces disability most frequently in the third and fourth decades of life.

DIAGNOSIS AND TREATMENT

Preoperative diagnoses made in 37 patients were confirmed by the surgeon, and demonstrate the accuracy of the diagnosis of a pure type stenosis (table 1). The confirmation of six of 13 preoperative diagnoses of mitral stenosis with insufficiency gives some indication of the difficulty of determining the major factor

in those patients with findings of both stenosis and insufficiency. It is also significant that in nine patients presumed to have other valvular involvement in addition to mitral stenosis, the surgeon could confirm the multiplicity of valve lesions in only three patients. This also points out the limitations of present diagnostic technics in making a complete, accurate diagnosis in acquired heart disease. Certainly those patients with multiple lesions should not be denied the benefits of exploration. In those instances where aortic stenosis was diagnosed in combination with mitral stenosis, the former lesion was found to be absent or minimal, and in no case was it believed that aortic valve surgery was indicated.

TABLE 1. *Diagnoses*

Diagnosis	Preoperative	Confirmed by surgeon
Mitral stenosis	27	27
Mitral stenosis with insufficiency	13	6
Mitral insufficiency	1	1
Mitral stenosis with other valve lesions	9	3

As shown in table 2, 42 (84 percent) of the patients had definitive valvular surgery; of this group 92.8 percent were successfully treated by the finger-fracture technic. Three patients required the use of a valvulotome to relieve the stenosis; one of these three patients developed regurgitation to a rather marked degree, the other two patients have shown continued improvement.

Cardiac exploration in three patients disclosed a marked degree of nonremediable regurgitation. Thoracotomy with cardiac palpation was carried out in five patients; in four of these the left atrium was occluded by thrombus, and in each instance the auricular appendage was too small to admit a finger into the heart. The use of alternate routes, either through the anterior atrial wall or the pulmonary vein, were contraindicated by the presence of an atrial thrombus. One of the patients went into shock shortly after the pleural cavity was opened, and did not respond to resuscitative measures. The chest was hurriedly closed without opening the pericardium. This patient's postoperative course was progressively downhill with the development of heart failure, lung abscess, and empyema. Death occurred on the thirty-third postoperative day. Currently we believe this death could possibly have been avoided had the stenosis been relieved. We do not consider hypotension during the course

of operation a specific contraindication to correction of the stenosis.

Microscopic study was carried out on tissue from 30 lung biopsies and on 32 auricular appendage specimens. Twenty-one of the 30 lung specimens revealed a recognizable degree of pulmonary arteriosclerosis which in 14 instances was considered marked. This suggests that changes occur in the pulmonary vascular tree in response to the persistent increasing pulmonary hypertension existing even in moderately advanced mitral stenosis. This is in disagreement with the observations published by Graham and associates[20] in which they concluded pulmonary changes existed only in severe degrees of stenosis.

TABLE 2. *Operative results*

Operation	Number of patients				
	Total	Improved	Unimproved	Not followed	Died
Commissurotomy					
Finger fracture	39	35	3	1	
Valvulotome	3	2	1		
Cardiac exploration	3		3		
Thoracotomy	5		4		1
Total	50	37	11	1	1

Active carditis was reported in 14 of the 32 auricular specimens. This is of uncertain significance when it is realized that active carditis was clinically manifested in only two patients following operation.

Mild failure occurred in three patients, and mild embolic phenomena were recognized in three patients. In two patients with previous history of psychiatric difficulty, postoperative depression occurred early but responded to psychiatric treatment.

CASE REPORTS

Case 1. This 23-year-old woman first developed dyspnea in the last trimester of her first pregnancy. She was treated by bed rest and had an uneventful delivery. For the next five years the patient was given small doses of digitalis. There was an increase in dyspnea and ankle edema with each menstrual period. These symptoms usually appeared midway in the menstrual cycle and disappeared with the onset of the menstrual flow. No specific history of rheumatic fever was obtained.

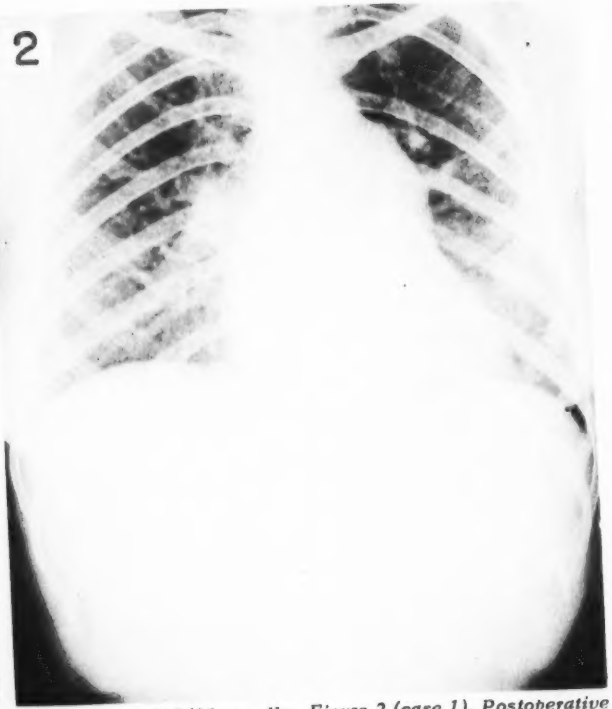


Figure 1 (case 1). Preoperative roentgenogram. Pulmonary artery pressure was 100/55 mm. Hg. Figure 2 (case 1). Postoperative roentgenogram. Pulmonary artery pressure was 39/19 mm. Hg.

In January 1952, when the patient was 28 years old, a physical examination revealed her to be well developed and in no acute distress. There was moderate distention of neck veins. Her face was slightly cyanotic when she was in a reclining position. There was a loud presystolic murmur at the apex of the heart, and an opening snap with a loud diastolic murmur was noted. The pulmonary second sound was accentuated and a diastolic murmur was heard in the pulmonary area. The liver edge was palpable two fingerbreadths below the right costal margin.

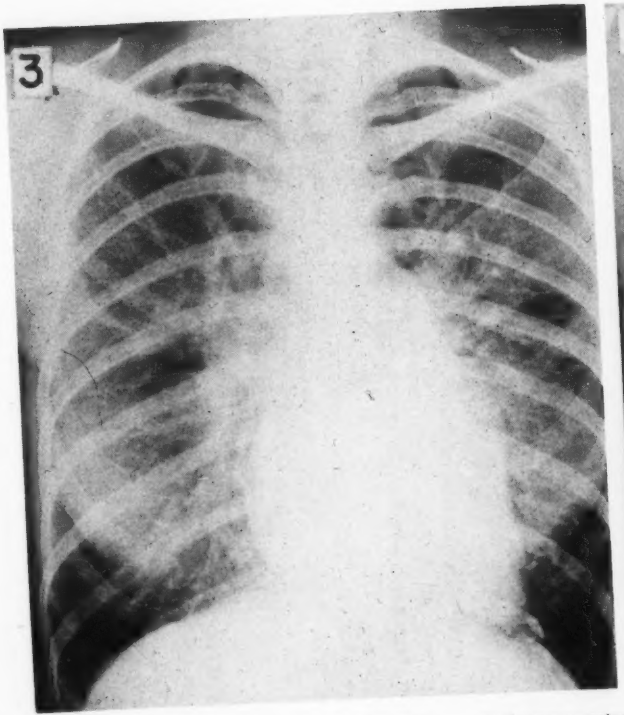
A roentgenographic examination revealed the heart to be enlarged about 30 percent (fig. 1). The enlargement was predominantly in the left auricle and right ventricle. No calcification of the mitral valve was visible on fluoroscopy. An electrocardiogram showed deformed T waves, suggesting auricular disease with right axis deviation. The P-R interval was 0.24 second. A cardiac catheterization on 14 January 1952 revealed pulmonary artery pressure of 100/55 and right ventricle pressure of 100/13-25 mm. Hg. A diagnosis of mitral stenosis was made.

On 31 January 1952, finger fracture valvulotomy was performed. The postoperative course was uneventful and the patient was discharged from the hospital on the thirty-sixth postoperative day. She was given digoxin throughout the postoperative course, and in November 1952 she resumed normal activity. A roentgenogram at this time revealed decrease in the cardiac shadow (fig. 2). A cardiac catheterization revealed pulmonary capillary pressure, 11 to 12 mm. Hg; left pulmonary artery, 39/19; right ventricle, 38/0-3; and right auricle, 5/2.5 mm. Hg.

Case 2. This 18-year-old white woman developed dyspnea and easy fatigability during childhood. At 13 years of age, following an episode of syncope and epistaxis, a heart murmur was found by her family physician. At this time the patient was treated with oxygen, digitalis, and bed rest, and some improvement was noted. Progression of the dyspnea was observed during the next five years and there were several episodes of congestive failure. Two years prior to admission to this hospital the patient had been given digitalis continuously but this did not control the increasing frequency of severe attacks of nocturnal dyspnea. Intermittent hemoptysis developed in June 1952. She was evaluated at this hospital at that time, but her general condition was poor and the question of rheumatic activity caused the cardiologists to defer operation. No specific history of rheumatic fever was obtained.

A physical examination on 10 October 1952 revealed a pale and apathetic patient with a blood pressure of 102/60 mm. Hg and a forceful precordial heave. A diastolic thrill could be pal-

Figure 1 (case 1). Preoperative roentgenogram. Pulmonary artery pressure was 100/55 mm. Hg. Figure 2 (case 1). Postoperative roentgenogram. Pulmonary artery pressure was 39/19 mm. Hg.



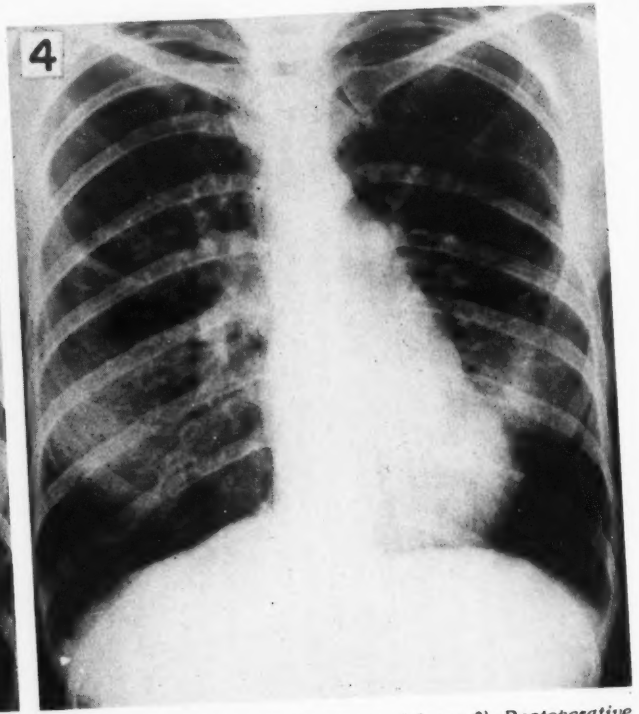


Figure 3 (case 2). Preoperative roentgenogram. Pulmonary artery pressure was 100/42 mm. Hg. Figure 4 (case 2). Postoperative roentgenogram. Pulmonary artery pressure was 36/20 mm. Hg. Note decreased vascularity of the lung fields.

pated at the apex of the heart and a grade II diastolic murmur, ending in a loud snapping first mitral sound, was heard at the apex. The second pulmonic sound was accentuated and there was a grade III systolic murmur along the left sternal border. A grade I apical systolic murmur could be heard. A roentgenogram revealed cardiac enlargement (fig. 3). The liver was not palpable and there was no peripheral edema.

Cardiac catheterization on 14 October 1952 revealed the right pulmonary artery pressure to be 100/42; right ventricle pressure, 95/10-2; and right auricle pressure, 9/0-2 mm. Hg. Bed rest, low salt diet, and 0.1 gram of digitalis leaf per day were continued. On 13 November 1952 a mitral valvulotomy was performed. The postoperative course was stormy and pulmonary infarction developed 24 hours after operation. The patient responded to antibiotics and bishydroxycoumarin (dicumarol) over a period of five days, but convalescence was slow. A followup cardiac catheterization on 17 December 1953 revealed the pulmonary capillary pressure to be 11/5; main pulmonary artery pressure, 36/20 (after three minutes' exercise, 60/36; after five minutes' exercise, 42/24); right ventricle pressure, 45/0; and right auricle pressure, 5/0 mm. Hg. The patient had gained weight and tolerated normal activity. A roentgenogram at this time revealed a decrease in the size of the cardiac shadow (fig. 4).

Figure 3 (case 2). Preoperative roentgenogram. Pulmonary artery pressure was 100/42 mm. Hg. Figure 4 (case 2). Postoperative roentgenogram. Pulmonary artery pressure was 36/20 mm. Hg. Note decreased vascularity of the lung fields.

SURGICAL CONSIDERATIONS

The current popular technics used in mitral commissurotomy are based on the principle as originally described by Brunton, using the finger-fracture method through the left auricular appendage. A few of our patients required incision of the commissures with a valvulotome. It is not the purpose of this article to describe the operative technic, but we believe that certain points need emphasis:

1. The posterolateral approach permits wider exposure and therefore a greater margin of safety, because adequate room is available for the control of hemorrhage if operative accidents should occur.

2. A flush maneuver is used to evacuate clots from the auricle and atrium prior to finger exploration. This eliminates the possiblity of a clot being pushed through the valve and the dependence upon carotid occlusion to arrest its progress. We have encountered several old clots of walnut size which were removed by flushing.

3. The proximity of the left coronary artery and its circumflex branch to the site of surgical entry into the heart place these vessels in constant jeopardy. Any clamping in the presence of hemorrhage may result in irreparable damage to the coronary circulation. On three occasions in this series, severe hemorrhage resulted from inadvertent tears in

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the auricle. In each instance hemorrhage was readily controlled by finger pressure until a clamp could be applied or a hemostatic suture placed under direct vision.

4. The performance of valvulotomy in patients with regurgitation was dependent upon the pliability of the anterior valve leaflet and the chordae tendineae. This is predicated on the belief that the partial opening of a stenosed commissure in the presence of a pliable leaflet and chordae will tend in part to alleviate the regurgitation. Postoperative results seem to justify this approach.

5. Shock appearing at the time the intracardiac manipulation is about to be performed should not contraindicate further surgery. When shock appears at this critical point in the operation, valvular stenosis undoubtly jeopardizes the patient's recovery from it. We believe it wise to complete the valvulotomy in these instances.

6. Various cardiac arrhythmias have been noted during cardiac palpation, but are relatively infrequent in digitalized patients. The usual measures should be used to control tachycardia prior to the opening of the heart.

7. We have accepted a massive clot filling the atrium as a contraindication for cardiac surgery.

CONCLUSIONS

Commissurotomy is now an accepted technic in the treatment of mitral stenosis. The immediate results are satisfactory in the majority of patients. Regurgitation is not necessarily a contraindication to exploration of the stenosed mitral valve, because a pliable anterior cusp when mobilized by commissurotomy may correct the regurgitation. The relief of mitral stenosis may be indicated in some patients with multiple valve lesions. Actual sharp division of the commissures is necessary in only a small percentage of patients. The complications of mitral surgery are predictable and are those usually associated with rheumatic heart disease. In this article we present our experience in 50 patients. A mortality rate of two percent places this type of cardiac surgery well within the realm of safety.

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THE PROFESSION OF MEDICINE

Medicine knows no race, creed, or color, but only the sacredness of human life. May it always be the servant of all, but the hireling of none. Greatness of the profession will remain as long as we look at the ills of man through the clear light of service and not through the colored glasses of wealth and selfishness. I believe that no profession offers better opportunity for growth in moral and ethical stature, for contribution to the welfare of society, and for the relief of individual human suffering. I believe that no profession permits the practitioner to approach so closely the goals of kindness, loyalty, devotion, and consecration as does medicine.

— JAMES L. HAMNER, M. D.
in *Virginia Medical Monthly*, p. 604, Nov. 1953

CARIES SYMMETRY AND GINGIVITIS IN MILITARY WOMEN

A Study of 243 WAVES

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NUMEROUS reports have appeared in the literature on the epidemiology of dental caries and gingivitis.[1,2] They have been primarily concerned with the incidence of these conditions in men or a comparison of such conditions between men and women. These reports were mainly from age and population groups of grammar school or early college levels. This article presents information on the occurrence of dental caries and gingivitis in women in the military service. The rate of bilateral occurrence has been included in this report to show the conformity with similar studies.[3,4]

METHODS AND MATERIALS

In the fall and winter, 1951-1952, 243 women (WAVES) at the Naval Training Center, Great Lakes, Ill., volunteered to participate in a study involving the topical application of sodium fluoride.[5] The majority of these women were from states east of the Mississippi River, but a few came from the remaining states and outlying possessions. Their ages ranged from 18 to 44 years with an average of 22.4 years. Daily working, eating, and sleeping habits were fairly uniform. The results reported here were taken from the files recorded on the initial examination before the fluoride was applied topically.

All dental and gingival examinations were made with a mouth mirror and explorer under excellent lighting conditions. The gingivae were assessed without the aid of air, gauze drying, or by the use of pressure on the tissue as recommended by some investigators. The same examiner performed both examinations on all of the subjects studied. A full-mouth roentgenogram plus four posterior bitewings were taken on each person and diagnosed by the examiner to supplement the findings of the clinical examination.

From U. S. Naval Training Center, Great Lakes, Ill.

The dental caries incidence and past caries experience were determined by a modification of the method described by Klein and associates.[6] The results permitted the scoring of decayed, missing, and filled teeth (DMF) and also tooth surfaces. For purposes of this investigation, third molars and unerupted teeth were not included. The clinical and roentgenographic information was recorded on a revised public health code sheet which permitted additional security to the study against bias. Another clinician, independent of the study, reviewed the roentgenograms for purposes of locating all carious lesions.

The condition of the gingivae was noted and recorded by the method described by Massler and co-workers.[7] Separate sheets were used so that gingivitis could be tabulated on the top half of the sheet and gingival recession on the bottom half. Due to the loss of individual forms between the time of examination and reporting, only 135 cases are included in this category.

The material for the bilateral symmetry study was taken from the dental records after they had been corrected and correlated with the roentgenographic findings. The percentage of bilaterally occurring caries was noted for each pair of teeth. In this case, caries was considered present in the tooth if there was a lesion, a filling, or if a tooth was missing. This observed frequency of bilateral caries was compared to the expected frequency of bilateral caries based on the theory of mutually independent events.

This theorem of probability can be stated as follows: If two or more events are mutually independent so that the occurrence of one does not influence the occurrence of the others, the probability of all occurring is the product of their separate probabilities. To illustrate this further, in tossing one penny, the probability of tossing a head is 0.5. The probability of getting three heads when three coins are tossed at once is $0.5 \times 0.5 \times 0.5$ or 0.125.[8,9]

This identical technic can be applied to the caries experience of teeth. In our study, 243 women were examined. As shown in table 1, of 243 pairs of maxillary first molars examined, 210 were both carious, 14 right only were carious, 10 left only were carious, and nine pairs showed no caries. The percentage of carious right maxillary first molars was therefore 92.2 ($210 + 14 = 224 \div 243 = 0.992$). Similarly the percentage of carious left maxillary first molars was 90.5 ($210 + 10 = 220 \div 243 = 0.905$). Following the example of the pennies, the product of these two percentages, 92.2 and 90.5, will give the expected frequency with which both right and left molars should be carious in the same mouth, in other words, the probability of getting

TABLE 1. *The distribution of bilateral caries in 243 WAVES*

Tooth	Bilateral		Carious		Total	Carious right		Carious left		Bilateral caries expected	Bilateral caries observed	X^2 (chi-square)
	Non-carious	Carious	Right only	Left only		Number	Percent	Number	Percent			
Upper												
2d molar	17	200	13	13	243	213	87.7	213	87.7	76.9	82.3	58.1*
1st molar	9	210	14	10	243	224	92.2	220	90.5	83.4	86.4	40.3*
2d bicuspid	31	164	15	33	243	179	73.7	197	81.1	59.8	67.5	48.0
1st bicuspid	40	147	31	25	243	178	73.3	172	70.8	51.9	60.5	44.3
Cuspid	120	55	38	30	243	93	38.3	85	35.0	13.4	22.6	38.4
Lateral	79	91	37	36	243	128	52.7	127	52.3	27.6	37.4	37.8
Central	95	112	16	20	243	128	52.7	132	54.3	28.6	46.1	120.2
Lower												
2d molar	5	222	10	6	243	232	95.5	228	93.8	89.6	91.4	29.6*
1st molar	4	226	6	7	243	232	95.5	233	95.9	91.6	93.0	21.7*
2d bicuspid	32	152	30	29	243	182	74.9	181	74.5	55.9	62.6	30.9
1st bicuspid	110	69	35	29	243	104	42.8	98	40.3	17.2	28.4	51.7
Cuspid	205	113	14	11	243	27	11.1	24	9.9	1.1	5.3	49.2*
Lateral	215	10	10	8	243	20	8.2	18	7.4	0.6	4.1	56.9*
Central	213	15	9	6	243	24	9.9	21	8.6	0.9	6.2	91.5*

*Approximate values (all showed an expected number of less than 5).
The probability of obtaining X^2 equal or greater than that observed was less than one percent for all teeth.

bilateral caries if only factors of chance were in operation. By calculation, this expected frequency is 0.992 × 0.905 = 83.4 percent.

The actual experience or observed frequency of bilateral caries, however, was 86.4 percent (210 ÷ 243 = 0.864). For determining the significance of the difference between the expected frequency of 83.4 percent and the observed frequency of 86.4 percent, the chi-square (X^2) method was used based on the expected number of carious and noncarious teeth.

RESULTS

The dental caries rates of 243 WAVES are recorded in table 2. There was a range of six to 40 DMF units per person (attacked by caries) with a mean of 22.3 units. The number of decayed, missing, and filled surfaces averaged 50.8 per person for the group with a range of 11 to 114. The average number of open carious lesions per person was 6.7, with a range of zero to 22. There was an average of 4.9 missing teeth per person and 0.4 impacted teeth.

TABLE 2. *Rates for units and surfaces of decayed, missing, or filled teeth in 243 WAVES*

DMF units	WAVES	Percent	DMF surfaces	WAVES	Percent
6-10	16	6.6	11-20	9	3.7
11-15	24	9.9	21-30	27	11.1
16-20	51	21.0	31-40	29	11.9
21-25	65	26.7	41-50	59	24.2
26-30	60	24.7	51-60	50	20.6
31-35	19	7.8	61-70	33	13.6
36-40	8	3.3	71-80	16	6.6
			81-90	11	4.5
			91-100	7	2.9
			101-110	1	0.4
			111-114	1	0.4
Total	243			243	

Mean DMF units = 22.32 per person
Mean DMF surfaces = 50.85 per person

TABLE 3. *Separate papillary, marginal, and attached gingival units in 135 WAVES*

Units	Papillary		Marginal		Attached	
	WAVES	Percent	WAVES	Percent	WAVES	Percent
0	21	15.6	20	14.8	133	98.5
1-5	19	14.1	9	6.7	2	1.5
6-10	44	32.6	40	29.6		
11-15	35	25.9	46	34.1		
16-20	13	9.6	18	13.3		
21-25	3	2.2	2	1.5		
Total	135	100	135	100	135	100

Mean Papillary = 8.47 Mean Marginal = 9.64 Mean Attached = 0.02

The data on gingivitis were accumulated on 135 WAVES and are reported in tables 3 and 4. Separate tabulations of the number exhibiting various degrees of papillary, marginal, and attached gingival involvements (PMA) are given in table 3. More than half of those exhibiting papillary and marginal gingivitis showed disturbances in six to 15 units of involvement respectively. A distribution according to total gingival experience is

TABLE 4. *Total papillary, marginal, and attached gingival units in 135 WAVES*

Units	WAVES	Percent
0	20	14.8
1- 5	2	1.5
6-10	11	8.2
11-15	20	14.8
16-20	19	14.1
21-25	20	14.8
26-30	25	18.5
31-35	10	7.4
36+	8	5.9
Total	135	100

Mean PMA = 18.29

shown in table 4. It can be seen that only 14.8 percent of these were free from any gingival disease. The mean total PMA index was 18.3 units for the group. A spot graph, comparing DMF to PMA, did not reveal a correlation between the two.

An attempt was made to establish that the phenomena of bilateral caries occur with such regularity in each of 14 pairs of teeth in 243 women as to become statistically valid even when dealing with relatively small samples. In all these teeth bilateral occurrence of caries was more than triple the requirements for statistical significance and in most cases the requirements were exceeded over six times. The observed frequency of bilateral caries in the upper central incisors differed from its expected frequency most significantly with a chi-square of 120.2. The chance of obtaining this result is much less than one in a thousand.

SUMMARY

In a study of the incidence of caries and gingivitis in 243 WAVES, the average DMF was found to be 22.3 teeth and 50.8 surfaces. The average number of gingival units involved in this group was 18.3, and is reported on only 135 of the group. The chi-square method was used to verify the significance of the difference between the observed and expected frequency of bilateral symmetry in each of 14 pairs of teeth in 243 persons. Expected frequency was derived from the principle of mutually independent events. It was shown that bilateral symmetry on all pairs of teeth was highly significant for caries.

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COMPARISON OF ORAL CALCULUS DEPOSITION IN SHIP AND SHORE-BASED PERSONNEL

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ALTHOUGH there have been many epidemiologic studies of dental caries, few observations of the rates of calculus formation in large population groups have been reported. A controlled experiment involving the observation of large segments of the population living under different conditions and under various dietary regimens could conceivably be of assistance in indicating the probable causes of oral calculus.

The purpose of this study was to compare the amount of calculus formed in personnel in the naval service living aboard ship with that in a like group of personnel stationed at a shore installation. It was believed that if the results of this observation should prove to be significant, the work could possibly be used as a pilot study for future observations of a greater number of patients.

No single factor can be regarded as paramount in the process of calculus deposition; rather, there is an intricate interdependence of many physical and chemical activities which brings about the precipitation of calcium salts from the saliva, and the deposition of these salts on the surfaces of the teeth.

In general, those processes which may be associated with the formation of calculus are divided into two groups: (1) Those reactions concerned with the actual physicochemical precipitation of the inorganic salivary salts from the saliva, and (2) those processes related to the formation of an organic matrix to which the precipitated calcium salts may adhere.

Because the main inorganic constituent of calculus is $Ca_3 (PO_4)_2$, it could be postulated that the concentrations of calcium and phosphates in the saliva are related to the tendency of the saliva to form calculus. Tenenbaum and Karshan[1,2] noted this relationship and found that the calcium content of the saliva of patients exhibiting no oral calculus was significantly lower than that of patients presenting marked calculus forma-

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tion. Gurney and Huschart[3] found that the ingestion of $Ca_3(PO_4)_2$ could influence the calculus-forming components in the saliva.

It has been suggested by Rapp[4,5] that the saliva of certain patients tends to be oversaturated with respect to calcium and phosphate, so that these elements may be easily separated from the solution and deposited upon the teeth as oral calculus. This oversaturation is closely connected with the amount of calcium secreted and excreted by way of the salivary glands. One of the factors determining the output of salivary calcium is the calcium intake of the body.[4]

It is, therefore, not unreasonable to assume that the amount of calcium ingested in the diet might be a factor in determining whether or not certain persons will remain free of oral calculus. Because few, if any, communities maintain a water supply in which calcium ions are completely absent, a unique opportunity to observe a group in which this factor has been controlled exists aboard ship, where only distilled water is used for drinking and cooking purposes. It was believed that a comparison of such a shipboard group with a like shore-based group would be of interest in indicating the effect, if any, of this regimen on the formation of oral calculus.

METHOD

The calculus-forming tendencies of a group of 75 men living on board a ship (U. S. S. *Yellowstone*) and using only distilled water were compared with a group of 50 men stationed at the National Naval Medical Center. All of the subjects were of the white race, and the ages of both groups ranged from 20 to 30 years with a median age of 23 years. Only patients free from periodontal disease, gingival inflammation, and gross malocclusions were accepted for the study. Patients of both groups were re-examined six to eight months after a complete scaling. Only patients presenting some degree of supragingival formation of calculus at the time of the initial examination and scaling were accepted for the study groups. All the subjects gave histories of having received scalings "routinely" (every six to 12 months) during the past two years. In this way, it was possible to exclude from the study those persons who remain almost entirely free of calculus. The median time between the scaling and the examination (table 1) was seven months for the shore-based group and six and one-half months for the shipboard group.

Although generally speaking the diet available to the shore-based group and the food served aboard ship were similar in respect to mineral content, it was impossible to control rigidly the dietary regimen because those in the shipboard group were able to subsist ashore during liberty hours while in port.

Although no attempt was made to control the smoking habits of the subjects, the two groups were strikingly similar in percentage of nonsmokers, moderate smokers, and heavy smokers of cigarettes (table 2). The number of cigar and pipe smokers was negligible, and all fell into the "slight" calculus group.

TABLE 1. *Median number of months since previous scaling (varying from 6 to 8) in each group*

Group	Total patients	Moderate	Slight	Very slight	None
Shipboard	6.5	6.5	6	7	6
Shore-based	7	7	7	7.5	7

Repeated analysis of the water supply of the ship revealed the highest concentration of calcium ion to be 1.7 p. p. m. (parts per million) as compared with 14.78 p. p. m. (an average of 12 monthly samples) for the Montgomery County, Md., water supply used by the shore-based group.

TABLE 2. *Percent of cigarette smokers in each group*

Group	Nonsmokers	Less than ½ pack per day	½ to 1½ packs per day	Over 1½ packs per day
Shipboard	25.3	16	33.3	25.3
Shore-based	26.0	20	30	24

TABLE 3. *Distribution of patients by degree of calculus formation*

Degree of calculus formation	Shipboard group (percent)	Shore-based group (percent)
Class I - moderate	16.0	30
Class II - slight	13.3	44
Class III - very slight	37.3	14
Class IV - none	33.4	12
Total	100.0	100

The lingual surfaces of the lower anterior teeth were used as a basis for grading the amount of calculus deposition. Four classes were established:

Class I (moderate). Calculus was accumulated to a degree of thickness which was equal to or greater than the width of the lingual marginal gingiva (fig. 1).

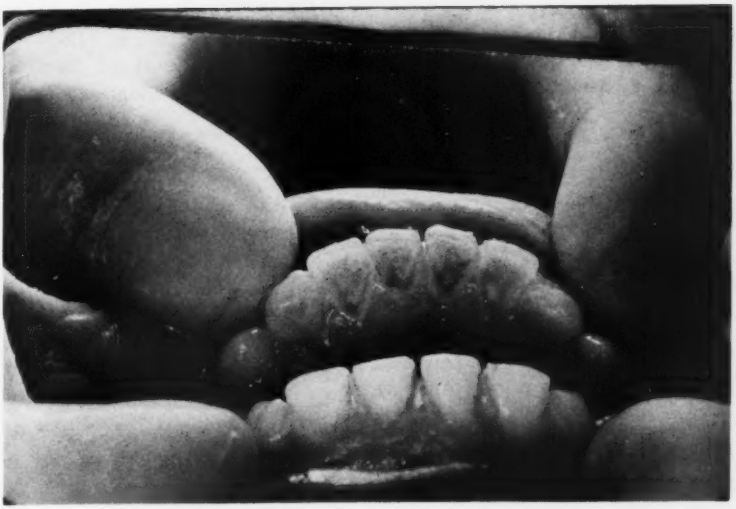

Figure 1. Deposition of calculus in a patient which would be termed "moderate." The thickness of the calculus is greater than the width of the lingual marginal gingiva.

Class II (slight). A line of calculus was deposited on the lingual surfaces of the teeth which in thickness was less than the width of the marginal gingiva (fig. 2).

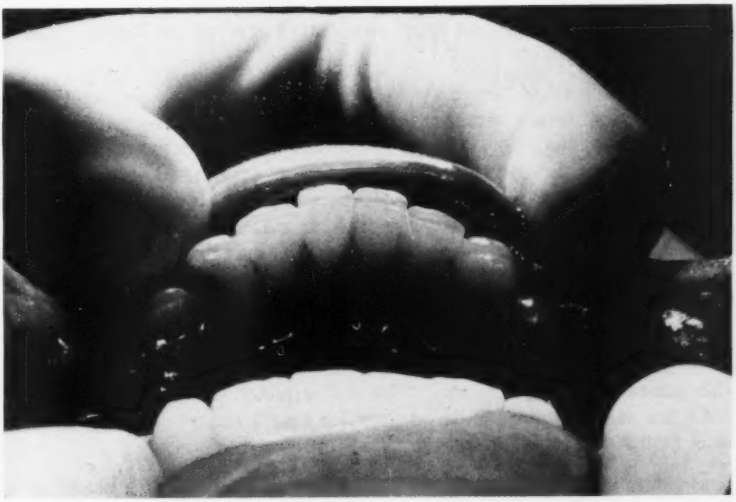

Figure 2. Deposition of calculus in a patient which would be termed "slight." The deposition is less than the width of the lingual marginal gingiva.

Class III (very slight). Only slight "flecks" of calculus could be detected on the lingual surface of the teeth. (The amount of calculus deposition in this class is so slight that it is difficult to demonstrate by intraoral photography.)

Class IV (none). No calculus was discernible.

RESULTS

At the end of the six-month period, the percentage of those in the shipboard group demonstrably free of oral calculus was nearly three times that of the group on shore. Furthermore, only 29.3 percent of the shipboard group developed moderate or slight deposits of calculus as compared to 74 percent of the men on shore. Conversely, 70.7 percent of the shipboard group, but only 26 percent of the shore-based control group, had very slight deposits or none (table 3).

Tests for statistical significance (table 4) indicated a "chi square" of 25.064. The probability of obtaining X^2 of 25 or greater due to chance occurrence is much less than one in 100. Therefore, the observed deviations from the expected can be termed statistically significant.

DISCUSSION

There are many factors which may be associated with the observed decrease in calculus deposition of the shipboard group. It is possible that various psychosomatic factors affecting men living under shipboard conditions could, by altering the rate of flow[6,7] and the viscosity of the saliva, influence the amount of calculus deposition.

A significant factor may be the improved oral hygiene practiced by shipboard personnel who frequently have more leisure time in which to carry out an adequate health program. However, it also could be postulated that the shore-based group, being made up largely of hospital corpsmen, should be more health conscious and should be expected to maintain a more exacting regimen of dental hygiene. Individual variations in home-care procedures are difficult to standardize in any study of this type. The introduction of these variations can perhaps best be controlled by using larger numbers of patients in future study groups.

A slight increase in the amount of calculus accumulation in the shore-based group might be anticipated in view of the fact that the median time between scaling and examination was one-half month longer than that of the shipboard group.

It was not possible to determine whether the men aboard ship actually consumed a smaller quantity of food than they would have had they been stationed ashore. It has been observed in the past that calculus deposition is related to the quantity of food consumed.[8]

TABLE 4. *Statistical analysis (chi-square table) of observed and expected frequencies of calculus formation*

Degree of calculus formation	Group	Number observed (O)	Number expected (E)	O-E	$(O-E)^2$	$\frac{(O-E)^2}{E}$
Moderate	Shipboard	12	16.2	-4.2	17.64	1.084
	Shore	15	10.8	4.2	17.64	1.63
Slight	Shipboard	10	19.2	-9.2	84.64	4.410
	Shore	22	12.8	9.2	84.64	6.61
Very slight	Shipboard	28	21	7	49	2.33
	Shore	7	14	-7	49	3.5
None	Shipboard	25	18.6	6.4	40.96	2.20
	Shore	6	12.4	-6.4	40.96	3.3

Degrees of freedom—3 $X^2 = 25.064$

In view of the uncontrollable factors involved it is not possible to indicate that the calcium content of the water supply was alone responsible for the significant difference in calculus deposition noted.

CONCLUSIONS

It would appear on the basis of this study that shipboard personnel are exposed to certain factors which are not conducive to calculus formation. The determination of the exact nature of these factors would require a more complex and more highly supervised and controlled study on larger groups of personnel.

Salivary analysis of large groups of patients on various dietary regimens and using both distilled and hard water supplies could conceivably be of aid in evaluating the underlying predisposing factors.

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THE TOO BUSY PRACTITIONER

We often hear of the professorial physician, or the full-time research physician who has retired to his ivory tower, not understanding the problems of the patient or of the practitioner. But what about the private practitioner who retires to his private office and says, "I haven't time to consider your worries about your business or family. You have a gastric ulcer, so just stop worrying." It would be just as logical for him to say to another patient, "Yes, you have pneumonia, but I haven't time to give you penicillin." Unless a doctor takes into account every aspect of a man's life, he is giving inadequate treatment.

—H. KENT TENNEY, M. D.
in *Wisconsin Medical Journal*,
p. 586, Nov. 1953

PREVENTION OF HEADACHE FOLLOWING SPINAL ANESTHESIA

PAUL KUSHNER, *Captain, MC, USAR*

ONE of the most distressing sequelae of spinal anesthesia, both for the patient and the anesthesiologist, is the postspinal tap headache. It often complicates an otherwise uneventful postoperative course, and minimizes the salutary effects of the anesthesia. Notoriously resistant to treatment, it retards full ambulation, thus prolonging hospitalization.

The headache may be so severe that it leaves the patient with a lasting and distasteful impression of spinal anesthesia. He soon forgets the role that the anesthetic played in his treatment, but he recalls the "miserable" headache that was its aftermath. In interviewing patients preoperatively, one often encounters a reluctance to accept spinal anesthesia because they remember the oft-told and retold experience of an acquaintance who had a postspinal anesthesia headache. Many patients want to be assured that "this will not happen to me." Such assurances are best not given. Yet the physician's failure to do so is often misinterpreted by the patient, and leaves him with the erroneous impression that the incidence must therefore be disproportionately high.

No generally effective medical treatment for the postspinal headache has been found; the results obtained with commonly used analgesics are disappointing. Nor has any method been evolved for preoperatively determining headache-prone persons, although it has been suggested that such a personality type exists.[1-3]

Most anesthesiologists are now agreed that the causative factor is the continued loss of spinal fluid through the lumbar puncture site, with the subsequent reduction of spinal fluid pressure.[3-6] The resultant loss of buoyancy of the brain causes tension on the tentorium cerebelli and falx cerebri. The traction on these structures gives the characteristic spinal headache which persists as long as the patient maintains an erect posture. Relief usually follows promptly on assuming a supine position,

From the 121st Evacuation Hospital, Korea. Capt. Kushner is now assigned to the U. S. Army Hospital, Ft. Belvoir, Va.

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thus relieving the tension on the supporting structures. Headaches that do not have these characteristics are probably not spinal in origin, although any headache which occurs in a patient following spinal anesthesia is usually attributed to that cause.

It has been estimated by Franksson and Gordh[7] that spinal fluid is lost at the rate of 10 cc. per hour by seepage into the extradural space after lumbar puncture. Prophylactic measures must therefore be directed at restoring the cerebrospinal fluid equilibrium. This can be partially accomplished by puncturing the dura with small bore needles and minimizing the loss of fluid through this site. It has been shown that there is a progressive decline in the incidence of spinal tap headache as the bore of the needle is reduced from 20 to 22 to 26 gage and that headache following spinal anesthesia can be decreased by using small gage spinal needles.[8-10]

METHOD AND TECHNIC

The present study was undertaken with a 26-gage, 2.5-inch spinal needle. All of the patients were soldiers between the ages of 19 and 47, with the average age of 24.4 years. To minimize the postoperative loss of spinal fluid through the puncture site, all patients were routinely asked to lie flat in bed for a period of six hours postoperatively. They were also encouraged to drink liquids freely to restore adequate hydration. The patients for this study were unselected. The present series represents consecutive admissions to the surgical service where spinal anesthesia was the method of choice. Three patients in this group had had spinal anesthesia previously, followed by headache. Procaine hydrochloride and tetracaine hydrochloride (pontocaine hydrochloride) were used exclusively.

In completing the study, certain technical difficulties were encountered in performing the tap with the 26-gage needle. The needle, being very flexible because of its fineness, had to be used with a 21-gage introducer needle to minimize the danger of breaking the needle in situ. The hub of the introducer needle prevented the 26-gage spinal needle from being pushed flush with the skin, and consequently there was a loss of usable length of about 1 cm. via the hub of the introducer. Thus shortened to 5.2-cm., the 26-gage needle was too short to reach the dura in very obese patients. In these patients the lumbar puncture was easily performed with the standard 22-gage needle and the dura was demonstrated to lie deeper than 5.2 cm. In this present group of 103 patients, only three fell into this category. Spinal fluid flows very slowly through the fine bore of the 26-gage needle, and it requires more patience on the part of the operator to wait for the fluid to appear. The use of the 26-gage needle is

also attended with a greater danger of breakage. In the hands of those experienced in doing lumbar punctures, and with the use of the introducer, this danger is greatly minimized.

RESULTS

Prior to the introduction of the 26-gage needle, lumbar punctures were routinely performed with the standard 22-gage spinal needle. The incidence of postspinal tap headache in a similar group in which the 22-gage needle was used was five percent. In the group in which the tap was performed with the 26-gage needle, there was not a single postspinal tap headache. The surgical procedures performed represented a fair sampling of the operations encountered in most military hospitals, and included 15 appendectomies, 21 inguinal herniorrhaphies, one umbilical herniorrhaphy, three exploratory laparotomies, 34 rectal procedures, 16 lower extremity procedures, and 10 circumcisions, making a total of 100 operations.

The group studied represented a fairly restricted age group, the majority being under 30; however, it is in the younger age group that postspinal tap headache is most commonly encountered.[4] Although these patients had the benefit of the type of psychologic "screening" that combat troops receive, they also were operated on in the field, away from the secure influences of home and family.

The results in this group were very gratifying, and justified the extra effort expended in employing a 26-gage needle. The procedure merits consideration for routine use in spinal anesthesia, provided adequate precautions are taken by the operator to prevent breaking the needle in situ.

SUMMARY

Because the incidence of postspinal tap headache has been observed to decrease progressively as the bore of the needle used in introducing anesthetics is reduced, a 26-gage, 2.5-inch spinal needle was used in 100 unselected patients. None of these patients developed headache after spinal anesthesia. It is believed this procedure merits consideration for the routine use of spinal anesthesia.

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WHAT THE FUTURE HOLDS

The lowest death rate in the history of the country and the largest annual number of births were forecast for 1954. Dr. Leonard A. Scheele, Surgeon General of the Public Health Service, made his statement on the basis of vital statistics reports for the first 10 months of the year.

The death rate for 1954 is expected to close at 9.2 deaths per 1,000 population, a substantial drop from the rates of 9.6 or 9.7 which have prevailed over the past five years.

Births will top the four-million mark for the first time, according to preliminary estimates. The expected birth rate of 25.2 per 1,000 population is the second highest in 28 years, and only 5.3 percent below the peak year of 1947.

The marriage rate sank to 9.2 per 1,000 population in the first 10 months of 1954, compared with 9.7 for the same period the year before. Low birth rates during the 1930's, resulting in relative scarcity of young people of marriageable age in the present decade, were held chiefly responsible for the marriage decline.

Divorces in the first 9 months of 1954 were down 4 percent from the comparable 1953 period, on the basis of reports from 25 areas. Since the 1946 peak, divorce rates have dropped over 40 percent.

THE ARMED FORCES INSTITUTE OF PATHOLOGY

RALPH M. THOMPSON, *Colonel, USAF (MC)*

ON 21 May 1862, nearly 93 years ago, the Armed Forces Institute of Pathology was founded, and now after these many progressive and fruitful years it finds itself occupying one of the most modern and unique edifices in the world, located on the grounds of the Walter Reed Army Medical Center in Washington, D. C.

This new building comprises more than 200,000 square feet and is eight stories high, three of the stories being below ground level. The main wall structure is without windows and is of blast-resistant, reinforced concrete.

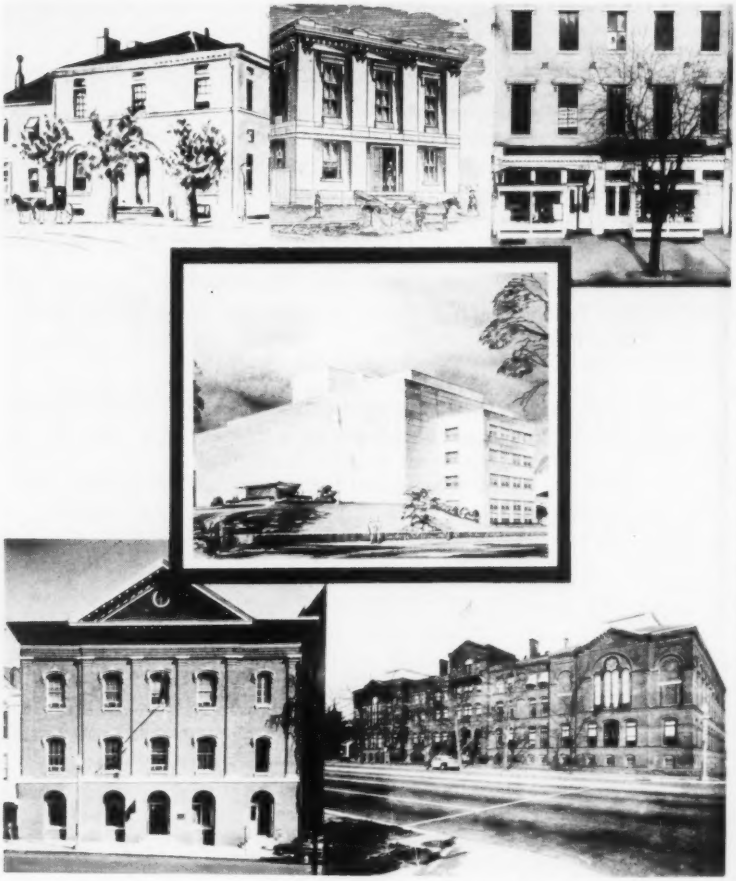
The Armed Forces Institute of Pathology (AFIP) was founded by the young, vigorous, and venturesome Surgeon General William A. Hammond, and was known as the Army Medical Museum. His great vision and foresight led to the creation of an institute of pathology second to none. This current position and standing of the AFIP is the culmination of the dreams and wisdom of many notable and distinguished minds of world medicine, past and present.

Three months to the day following the creation and issuance of the historical Surgeon General's Circular 2, War Department, dated 21 May 1862, the Armed Forces Institute of Pathology, which we know today, became a physical reality under the direction of Major John H. Brinton. The Museum then consisted of three dried and varnished specimens resting on a small shelf above the inkstand on the desk of the newly appointed curator, Major Brinton. There were a few preparations of human anatomy such as several human craniums, a skeleton, two primitive wax injections demonstrating the vascular system, and some plastic casts and drawings which were also in the office of the Surgeon General.

From this modest beginning, the Armed Forces Institute of Pathology today houses almost 700,000 accessions, comprised of surgical biopsy specimens, complete autopsy data and speci-

From Armed Forces Institute of Pathology, Washington, D. C. Colonel Thompson is deputy director.

mens, and allied pathology material all of which is filed for teaching, research, and posterity. During the preceding 93 years the growth of the AFIP has been phenomenal; today, as occupancy of the new building commences the AFIP is already faced



Quarters occupied by the Army Medical Museum and the Armed Forces Institute of Pathology from 1862 to 1955. Top row, left to right: Riggs Bank Building, 1862-1863; Corcoran School House, 1325 H Street, N. W., 1863-1866; Pennsylvania Avenue, 1863. Bottom row, left to right: Ford's Theatre, 1867-1887; Seventh Street and Independence Avenue, S. W., 1887-1955. Center: Present edifice.

with problems incident to inadequate space, and necessary steps have been initiated for possible creation of a new wing and other additions.

With continued progress, foresight and future promise, the Army Medical Museum was redesignated in 1946 as the Army Institute of Pathology, a name more suited and befitting the missions and functions incident to professional and scientific advancement.

Recognizing the Army Institute of Pathology as a national organization, on 6 July 1949, following the unification of the armed services, the present designation was adopted, namely, the Armed Forces Institute of Pathology of the Department of Defense.

The Armed Forces Institute of Pathology is further defined and established by the current Department of Defense Directive 5136.5 dated 6 August 1953, pursuant to authority vested in the Secretary of Defense by the National Security Act of 1947, as amended. The responsibilities, functions, and relationships are clearly designated and set forth as a joint agency of the three military departments under the authority, direction, and control of the Secretary of Defense with the Secretary of the Army as the management agent. Under existing regulations the policy direction regarding medical and allied activities of the Armed Forces Institute of Pathology is vested in the Board of Governors which consists of the Surgeons General of the Army, the Navy, and the Air Force or their respectively designated alternates who, in the absence of the principals, are authorized to act or speak for them.

Located on the grounds of the Walter Reed Army Medical Center incident to Congressional action, (Bill H. R. 6478) amending Public Law 626, Eightieth Congress, in 1950, the current position of the Armed Forces Institute of Pathology is perhaps best defined by Major General Leonard D. Heaton, MC, USA, the Commanding General of the Center. Before his key staff members, on 13 August 1954, a meeting also attended by representatives of The Surgeon General of the Army, Commanding General, Military District of Washington, and the Directorate of the Armed Forces Institute of Pathology, he stated the following, which is based upon existing directives:

"It should be made plain at the outset that the Armed Forces Institute of Pathology is basically a tripartite organization—Army, Navy, and Air Force. It is a separate, distinct class 2 organization under administrative jurisdiction of The Surgeon General of the Army and under the command of The Director. Although the Armed Forces Institute of Pathology will be physically located on the Post at Walter Reed, the only command responsibility that will be exercised by the Center will be of necessity in those areas of administration and logistical support, the responsibility for which has been laid down in SGO Administrative

Letter 1-6. Insofar as those areas are concerned, The Director of the Armed Forces Institute of Pathology will co-ordinate his activities with the Center command."

ORGANIZATION

The director of the Armed Forces Institute of Pathology is assisted by two deputy directors representing the other two military departments. He is further assisted by a professional, technical and clerical staff consisting of medical service or medical department officers and other military personnel of the Army, the Navy, and the Air Force, and also such civilian personnel, which includes consultants and experts, which he, with the approval of the Secretary of the Army, as management agent, determines is necessary.

With the continued concurrence of the board of governors and the approval of the Secretary of the Army, The Director is also aided by a Scientific Advisory Board of Consultants appointed by the Secretary for a term not to exceed five years. These members are eminent specialists of the medical, dental, and veterinary profession.

The Armed Forces Institute of Pathology, by its charter, serves as a central laboratory of pathology for the Department of Defense and such other Federal agencies agreed upon by the Secretary of Defense and the head of the agency concerned. It is designated as a self-contained and independent institution. The Veterans Administration and the United States Public Health Service have been included in this service, and more recently the Atomic Energy Commission and the Atomic Bomb Casualty Commission. The Armed Forces Institute of Pathology also functions in cooperation with the National Research Council in connection with the operation of the 22 registries of special pathology under the American Registry of Pathology, which is one of its major components (see below). Also, the AFIP along with the National Research Council's Subcommittee of Oncology, under the Committee on Pathology, is charged with the responsibility of the completion of the *Atlas of Tumor Pathology,* a work which is internationally known. The latter-mentioned Federal agencies, which comprise the total complement, furnish certain professional, subprofessional, and clerical personnel thus rounding out for the most part the existing family. To arrive at the total personnel figure certain fellows, sponsored by national medical organizations and a varying number of volunteer workers, must be included. Some of the latter are from foreign countries.

FUNCTIONS

The principal responsibilities and functions of the Armed Forces Institute of Pathology under established and fixed policy are as follows:

1. Maintain a consultation service for the diagnosis of pathologic tissue for the Department of Defense, other federal agencies and for civilian pathologists and serve as the chief reviewing authority on the diagnosis of pathologic tissue for the Army, Navy, and Air Force.

2. Conduct experimental, statistical, and morphological researches in the broad field of pathology, including correlation with such other medical specialties as will enable the Institute to effectively pursue its research projects.

3. Provide instruction in advanced pathology and related subjects to medical, dental, and veterinary officers of the Armed Forces and, based on availability of facilities to such other qualified professional persons who are authorized to study or receive graduate instruction at the Institute.

4. Train qualified and approved enlisted personnel of the Armed Forces in pathologic technics and in relevant medical photographic, medical arts, and museum activities.

5. Prepare or otherwise procure and duplicate teaching aids such as sets of microscopic slides, photographic material, medical visual aids, or other texts illustrating the pathology of the various special medical fields used in the training of Armed Forces personnel.

6. Donate or loan duplicate pathologic, photographic, and other educational material to other Federal medical services, museums, medical schools, scientific institutions, and to qualified persons connected with medical, dental, or veterinary professions, when determined appropriate and practicable.

7. Operate the American Registry of Pathology as a co-operative enterprise in medical research and education between the institute and civilian medical profession under such conditions as may be agreed upon between the board of governors and the National Research Council.

8. Maintain a medical illustration service for the collection, preparation, duplication, publication, exhibition, reference, and file of medical illustrative material of medical military importance, except original motion picture footage, primarily for the support of programs of the institute but which may be made available to the medical services of the Armed Forces, other Federal agencies and qualified persons, when determined appropriate and practicable.

9. Maintain medical museums for the instruction of qualified and authorized persons and display openly selected museum exhibits to the lay public.

10. Perform such other related functions as may be assigned from time to time.

From its beginning in 1862 until 1920, the major mission of the museum was collection and display. This emphasis was very important and necessary, and this concept laid the foundation for the structure that exists today.

In 1920, Major (now Brigadier General, USA (Ret.)) George Russell Callender, an eminent and distinguished physician and pathologist, and an outstanding medical administrator with great wisdom and foresight, lifted the Armed Forces Institute of Pathology from a depot for the collection of morbid anatomical specimens to an institution actively participating in the study of living pathology, pathologic research, and pathologic education. He launched the greatest and most dynamic pathologic center in the world. By his untiring effort and great medical vision, various directives were modernized and changed so that complete autopsy data and material and surgical biopsy material were required to be sent in for study, statistical research, and permanent files. In 1920, the then Major Callender initiated the first steps, with the co-operation of a group representing the American Academy of Ophthalmology, toward the organization of a registry of ophthalmic pathology, where pathology relative to the eye could be collected and cases followed for study and research. Thus was born the first of the 22 registries of pathology, and subsequently The American Registry of Pathology under the auspices of the National Research Council.

The concepts promulgated by Curator Callender in 1920 have been ably carried on by the successive curators and directors, together with the help and co-operation of their competent and efficient staffs. The late Major Paul Edgar McNabb, MC, USA, and Colonel Virgil H. Cornell, MC, USA (Ret.), during the years 1930 to 1935, did much to promote the new look of the Armed Forces Institute of Pathology. Colonel James Earle Ash, MC, USA (Ret.), was appointed curator in 1937 and later became the director of the newly designated Army Institute of Pathology in 1946. Colonel Ash was responsible for increasing the number of the various registries of pathology and enhanced greatly the professional stature and prestige of the AFIP. As commanding officer during the World War II years he organized a competent and well-rounded staff; and efficiently met the numerous problems incident to the great expansion.

Following the retirement of Colonel Ash, in 1946, Brigadier General Raymond O. Dart, MC, USA, was appointed the director.

Through the untiring efforts of General Dart, this organization became an Armed Forces Institute of Pathology and the new building became a physical reality.

Curators and directors from 1920 to 1955. Top row, left to right: Brigadier General George Russell Callender, MC, USA (Ret.), 1920-1922 and 1924-1929; Colonel James Earle Ash, MC, USA (Ret.), 1929-1931 and 1937-1946; Major Paul Edgar McNabb, MC, USA, 1931-1933. Bottom row, left to right: Major Virgil H. Cornell, MC, USA, 1933-1935; Brigadier General Raymond O. Dart, MC, USA (Ret.), 1935-1936 and 1946-1950; Brigadier General Elbert DeCoursey, MC, USA, 1950-.

General Dart was succeeded as director in 1950 by Brigadier General Elbert DeCoursey, MC, USA, who is the present director. It is only fitting that General DeCoursey enjoys the honor of being the first director in this new edifice, as he is responsible for the building we have today, which houses one of the most unique agencies of the Department of Defense. He has created the present team of the Armed Forces Institute of Pathology, dedicated to the service of humanity and devoted to the causes and effects of disease.

MAJOR DEPARTMENTS

The Armed Forces Institute of Pathology comprises four major components: the department of pathology, the medical illus-

tration service, the American registry of pathology, and the medical museum previously referred to.

TABLE 1. *American Registry of Pathology*

Registries	Sponsor	Date established
Bladder tumor	American Urological Association	1927
Cardiovascular pathology	American Heart Association, Inc.	1948
Chest tumor	American Association for Thoracic Surgery	1940
Dental and oral pathology	American Dental Association	1933
Dermal pathology	American Academy of Dermatology and Syphilology	1937
Endocrine pathology	None	1948
Genito-urinary pathology	American Urological Association	1947
Gerontology	Gerontological Society	1945
Hepatic pathology	American Gastroenterologic Association	1949
Kidney tumor	American Urological Association	1938
Leprosy	Leonard Wood Memorial	1950
Lymphatic tumor	American Association of Pathologists and Bacteriologists	1925
Neuropathology	American Association of Neuropathology	1942
	American Psychiatric Association	1942
Nutritional pathology	American Institute of Nutrition	1951
Musculo-skeletal pathology	American Society of Clinical Pathology	1943
Ophthalmic pathology	American Academy of Ophthalmology and Otolaryngology	1922
Otolaryngic pathology	American Academy of Ophthalmology and Otolaryngology	1935
Prostatic tumor	American Urological Association	1943
Radiologic pathology	American College of Radiologists	1947
	American Roentgen Ray Society	1947
	Radiologic Society of North America	1947
Tumors of female reproductive system	American Society of Clinical Pathology	1952
Tumors of gastro-intestinal tract	American Society of Clinical Pathology	1952
Veterinary pathology	American Veterinary Medical Association	1944

REGISTRY OF PATHOLOGY

During the calendar year 1953, 77,612 accessions were received, 21,537 of which were autopsy and 56,075, surgical biopsy specimens. The latter included 579 from the Atomic Bomb Casualty Commission in Japan. During the first six months of 1954 there was a seven and one half-percent increase in accessions over the same period in 1953.

The source of accessions reflects the spread of the workload from contributors. Fifty-two percent of the accessions were received from the armed services, while 27 percent were from the Veterans Administration, 13 percent from civilian sources through the various registries, and eight percent were from other Federal agencies, such as the United States Public Health Service, Atomic Energy Commission, Atomic Bomb Casualty Commission, Federal Bureau of Investigation, et cetera.

The registries of pathology now total 22 (table 1) and operate as previously mentioned under the auspices of the National Research Council. Each registry is sponsored by a national medical society and includes the fields of dental and veterinary medicine.

MEDICAL MUSEUM

The present medical museum, which was the parent and nucleus of the now existing Armed Forces Institute of Pathology, has two principal functions: one to exhibit and illustrate disease and medical problems to the lay public, and the other to collect and prepare gross pathologic material for teaching the medical professions.

Medical items and data of professional historical nature are collected and catalogued by the Museum staff and from time to time parts of these collections are exhibited as well as sent out on loan for exhibit purposes.

It is interesting to note that over 150,000 people visited the museum in the calendar year 1953, and this should be exceeded in 1954. Because of this educational value to the lay public, by Congressional edict, this activity remains in its present location on the Mall adjacent to the Smithsonian Institute where it can best function and perform its services. In the new building space is provided for the professional teaching material and laboratories for the investigation of methods for preserving and mounting specimens.

DEPARTMENT OF PATHOLOGY

With increased space, modern laboratories and other facilities, the department of pathology is completely activated including, in addition to the pathology division, the basic laboratory and the dynamic pathology divisions.

All these activities round out an excellent and complete pathology program and permit expansion from a limited morphologic and statistical approach. The sciences related to pathology are now represented and complete the pathology team. Each of the ancillary disciplines are staffed by competent scientists and assistants.

With the completion of the aforementioned department of pathology, the experimental, statistical, and morphologic research on diseases and injuries of medicomilitary importance will be accelerated and professional education and training will be more complete and definitely expanded to maximum efficiency.

MEDICAL ILLUSTRATION SERVICE

The medical illustration service is maintained for the collection, preparation, duplication, publication, exhibition, reference, and file of medical illustrative material of both medicomilitary and general professional importance. Though primarily for the purpose of supporting the educational and research programs of the Armed Forces Institute of Pathology, the facilities of the medical illustration service are made available to the medical services of the Army, Navy, and Air Force and to such other Federal and civilian agencies or individuals as may be approved by the director. The functions of the medical illustration service are:

1. Maintain a permanent central file of photographic negatives, color transparencies, photomicrographs, roentgenograms, drawings, and similar materials, illustrating diseases, wounds, and injuries of military importance and selected professional activities of the medical departments of the armed forces. This file is a permanent illustrative record of important medical activities and progress, and may be used for illustrating scientific articles and reports, the preparation of scientific exhibits, audio-visual aids, and the publication of atlases and other pathology texts required for the training programs of the armed services.

2. Maintain adequate facilities for clinical photography, photomicrography, and medical arts for the Armed Forces Institute of Pathology, and supervise similar activities in designated medical installations of the Army, Navy, and Air Force as indicated herein, or as may be directed by the surgeons general of the separate services.

3. Maintain and operate a training-aids library containing duplicate prints of motion picture footage on clinical subjects, "release prints" of official films and film strips, and a sample collection or photographic record of other Army, Navy, and Air Force official medical training aids for the Armed Forces Institute of Pathology.

4. Provide facilities for training in medical illustration and medical photographic technics for personnel of the armed forces and such other individuals as may be approved by the director.

5. Maintain technical reproduction facilities for printing and publishing the Armed Forces Institute of Pathology texts and illustrations.

6. Secure, prepare, or arrange all details in connection with the production of audio-visual training aids for the Armed Forces Institute of Pathology.

7. Arrange and accomplish all details relative to Armed Forces Institute of Pathology displays presented in the Institute, and at state, national, and military meetings and conventions.

8. Conduct researches in all phases of medical illustration.

In this new Armed Forces Institute of Pathology structure the routine activities heretofore performed, together with the activation of ancillary scientific disciplines, will permit expansion and will lead to greater activities in the field of experimental pathology, pathologic research, and medical education. Regarding the latter much will be accomplished through the medium of the incorporated closed-circuit color television system, designed for expansion with the availability of new and improved equipment. The television studio with its two-story ceiling height is most modern and impressive as are all of the other laboratories.

Dr. Melvin A. Casberg,[1] former Assistant Secretary of Defense (Health and Medical), in his address delivered at the cornerstone-laying ceremony on 20 October 1953, stated: "As we gather in the shadow of this modern edifice some may measure its greatness in terms of concrete tonnage or the dollar cost per square foot, but I choose to measure it in terms which do not lend themselves readily to the computations of an adding machine—namely by the countless number of human lives saved and by the suffering and misery alleviated, . . . As I spread the mortar which will unite the cornerstone with this building, it shall be my prayer that all our medical resources, civilian as well as military, similarly shall be cemented in a united fight against disease and for the preservation of our country."

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MILITARY MANPOWER CONSERVATION AND PEPTIC ULCER

BRUNO JASTREMSKI, *Colonel, MC, USA*
ELMER W. HEFFERNON, *Captain, MC, AUS*

PEPTIC ulcer is frequently diagnosed in army personnel, and is a considerable economic problem in loss of manpower. Over the years the medical officers have been keenly aware of this, as evidenced by articles published periodically relating the problem of peptic ulcer to morbidity,[1] military effectiveness,[2–4] social problems,[5] cost,[6] et cetera. Having reviewed these studies, we are reporting our statistics which are based on eight months' observation of 114 enlisted men and 22 officers with peptic ulcers who have been under our care. Our objective is to recommend a plan of treatment and disposition of these patients, and possibly to stimulate a more extensive study aimed toward deriving maximum benefits from both aspects of such a plan.

PLAN FOR PEPTIC ULCER MANAGEMENT

Our course of action at this hospital has been modified to the present plan. If the patient is an officer we try to retain him in the service with few exceptions, regardless of whether or not his ulcer was incurred in "the line of duty." We believe, however, that enlisted men who have had a peptic ulcer prior to coming on active duty should be separated under the provisions of SR 600-450-10 because of the possibilities of poor motivation and of aggravation of the ulcer by continued service. Occasionally such soldiers who were near the end of their regular enlistments have responded to treatment and were retained in active duty status until separated through regular channels. The major problem, however, is to decide who of the enlisted men with ulcers incurred in the line of duty should be given medical retirement with severance pay or pension, and who should be kept in active service.

Most of our patients were hospitalized after the diagnosis was established on the basis of a complete workup, including gastrointestinal series, on an outpatient status. Those who had night pain, radiation of pain to the back, obvious complications or failed to respond to treatment as outpatients were hospitalized. Ulcer craters were demonstrable in these patients much more fre-

From U. S. Army Hospital, Fort Benning, Ga.

quently than reported in a civilian gastroenterologic practice. All patients were followed by gastric analyses after Ewald meals, and careful examination of their stools for occult blood.

Patients were hospitalized for about three weeks, depending on severity of symptoms, response to treatment, and the presence of complications. They were placed on a strict Sippy diet which was rapidly progressed. They also received aluminum hydroxide gel (amphojel) hourly throughout the day and from two- to three-hour intervals during the night. Phenobarbital was given four times daily, before meals and at bedtime. Methantheline bromide (banthine bromide) was routinely used, in 100 mg. doses every six hours, or in 50 mg. doses before meals and one dose of 100 mg. at bedtime. Bed rest with bathroom privileges was maintained until symptoms had abated when ambulation was permitted. Smoking was prohibited and the patient was urged to abstain permanently. Small, simply written booklets about peptic ulcer were given to patients for their education. They were then briefed, either individually or in a group, about the ulcer problem in general and were encouraged to ask questions and join in the discussions. Roentgenograms and diagrams were shown to the patient when necessary for his further education. Other supportive therapy was given when indicated and any ulcer complications such as hemorrhage or obstruction were treated specifically as they arose.

After a patient had been asymptomatic for a week or more he was returned to duty or separated, depending on factors to be discussed. Those going back to duty received a P-3 on their physical profile, with recommendations for omission of field duty, heavy labor, and other duties that might interfere with their future care. Each profile is effective for six months, at the end of which time each patient must be re-evaluated by a medical officer. The patient was given a convalescent ulcer type of diet to follow for an indefinite period. He was instructed to take milk between meals, carrying it in a thermos bottle if necessary. He was given 0.016 gram of phenobarbital to take before meals and at bedtime, and 2 drams of aluminum hydroxide gel an hour after meals and at bedtime or at any other time for epigastric distress. Methantheline bromide was given depending on its need. Smoking was prohibited. Laxatives were also prohibited and for any resulting constipation a mixture of equal parts of orange juice and water one to three times daily was advised. General advice was given regarding emotional tension, proper rest, diet, and avoidance of alcohol. The patient was then seen as an outpatient once a month, or more often if necessary. Social aid was given when needed. This program was based on our firm belief that a peptic ulcer, especially duodenal, constitutes a chronic problem similar to diabetes mellitus, and thus demands pro-

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longed, intelligent management and prophylaxis to keep the patient well.

MANAGEMENT OF GASTRIC ULCERS

The management of patients with gastric ulcers was similar, with certain modifications. All were hospitalized, and those whose lesions were obviously malignant were operated on. The rest were treated as discussed earlier; however, upper gastrointestinal series were repeated at least once a week. If the ulcer failed to heal completely in five weeks the patient was operated on. When indicated, gastroscopic examination was done. After healing was complete, upper gastrointestinal series were repeated each month for three months, and then every three months for one year. These patients were also cautioned to report for examination every six months thereafter for two years. If at any time a recurrence of gastric ulcer is discovered, operation is advised. Two patients with gastric ulcers were operated on and both were found to have benign lesions.

Table 1 gives a breakdown of pertinent factors in our 136 patients with peptic ulcers. These patients were from 18 to 53 years of age; their length of service ranged from two weeks to 35 years, and their symptoms were present for from three weeks to 21 years. As expected, patients with longer service reacted more favorably to treatment. Three patients had gastric ulcers. Of 18 patients who hemorrhaged from their ulcers only one required surgical intervention. Eight patients had recurrence of their ulcer symptoms, following a simple surgical closure of perforated ulcers. Those who were married and were eating and living at home did better than those who ate in mess halls and lived in barracks. No correlation has been noted between gastric acidity and ultimate disposition.

RESULTS OF MANAGEMENT

On evaluation of the results of our management we find that 113 patients were sufficiently improved to return to duty. Of this group 21 were officers and 92 were enlisted men, representing a salvage rate of 95 percent and 81 percent respectively. One officer and 14 enlisted men were separated from the service without compensation because their ulcers were present prior to entering active duty. Eight enlisted men were given medical discharges with compensation because their ulcers were incurred in the service. We are aware that this is an eight-months' follow-up only; however, many of these patients had formerly been hospitalized elsewhere or before undergoing this therapeutic regimen were incapacitated for periods up to six or eight months at a time.

TABLE 1. *Statistical distribution of pertinent factors in 136 patients with peptic ulcers*

Patient	Number	Marital status			Motivation			Service incurred		Results		
		Married	Single	Unknown	Good	Fair	Poor	Unknown	Yes	No	Good	Fair	Poor
Officers	22	17	5		17	3	2		17	5	21		1
Enlisted	114	44	25	45	35	29	40	10	96	18	88	4	22
Total	136	61	30	45	52	32	42	10	113	23	109	4	23

We believe that the majority of the patients with ulcers in the army can perform satisfactory service provided that the recommendations on their physical profiles be followed. It is also important that the medical officer keep track of these patients by periodic checkups in order to maintain prolonged therapeutic control. In this manner a patient can be intelligently briefed and reassured, and adequately treated.

SUMMARY

We have presented a statistical survey with an eight-months' follow-up of 136 patients with proved duodenal ulcers. It is our belief that the salvage rate has been high enough to warrant further study and investigation in other military hospitals to determine whether a prolonged dietary and medical program will be worthwhile in conserving military manpower. It may be that further study will disclose that special mess hall facilities for such patients in the field would be of further value.

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HEART DISEASE AND PREGNANCY

There is little problem in the treatment of the patient who is pregnant and who suffers from heart disease. The physician should treat the heart disease as though the patient were not pregnant, and he should treat the pregnancy as though the patient did not have heart disease. In either condition the indications for treatment should be directed only to either the pregnancy or the heart disease. There is no heart disease which requires obstetrical interference. There is never an indication to interrupt a pregnancy or sterilize the patient because of heart disease.

— JOHN F. BRIGGS, M. D.
in *Diseases of the Chest*,
p. 152, Feb. 1954

THE PRACTICALITY OF FIELD RESEARCH

JOHN M. HOWARD, *Captain, MC, USAR*
RICHARD P. MASON, *Colonel, MC, USA*

THE army in the field has an opportunity for research that cannot be duplicated by any other organization. Just as the staff of a tuberculosis hospital studies tuberculosis, or that of a cancer hospital studies cancer, so must physicians in the Army Medical Service study trauma. There is no greater opportunity or responsibility in the field of trauma comparable to that of the Army Medical Service. To fail to recognize and to develop this opportunity is, first, to neglect the wounded soldier and, second, to retard the development of the Army Medical Service.

Field surgery is not civilian surgery under canvas; it is a specialty in itself. Unless its problems are studied and documented, the lessons of previous wars must be relearned in each war. Meanwhile, lives and limbs are needlessly lost. Field research offers the means of studying and documenting surgical experiences so that they need not be relearned each time at the expense of our combat casualties.

Field research offers the opportunity for finding better means of caring for the combat soldier. That such an attempt should be made is obvious. The question, therefore, is should the attempt be an organized project by a specialized full-time team? This question must be evaluated in terms of its contributions, real and potential, versus its cost in manpower and money. A review of the record of the work during 20 months of the Korean conflict demonstrates a conclusive, affirmative answer. A single specific example proves the value of an organized project and far more than justifies the outlay of manpower and money.

Shortly after the arrival in Korea in December 1951, of the surgical research team from the Army Medical Service Graduate School in Washington, D. C., it became apparent that one of the major problems confronting the surgeons was the management of casualties with arterial wounds. Standard practice in previous wars had been to ligate the vessels because anastomosis had not proved feasible. Meanwhile, progress had been made in the general field of vascular surgery in the United States which

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warranted a re-evaluation of this practice. The problem was discussed with the surgical consultant of the Eighth Army who stated that repair of arterial wounds in the Korean conflict had been repeatedly attempted by various surgeons and had not proved feasible. In his experience the only casualty who had not lost his leg as a consequence of injury to the popliteal artery was an occasional patient in whom the injury was not recognized and the wound not explored.

Repair of arterial wounds was, therefore, undertaken as a project by the surgical research team. The results demonstrated its feasibility.[1,2] The amputation rate following popliteal anastomosis decreased from 72 percent (World War II)[3] to about 20 percent. Surgeons from each hospital were instructed in the technic and provided with better instruments. As a result, the amputation rate fell throughout the theater. These trained surgeons, however, were soon rotated from Korea and the amputation rate rose. The operating surgeons from each hospital, who arrived as replacements, were then given instruction by members of the surgical research team.

As a result of this single research project, hundreds of limbs have been saved. The cost to the American taxpayer of supporting a veteran with an amputated extremity has been estimated at about $100,000.[4] A hundred such casualties would cost $10,000,000. The investment in the entire research team, in manpower and in dollars, is thus but an insignificant fraction of the immediate dividends from this single project.

Other studies have delineated the problems of management of the casualty with posttraumatic anuria, and definite progress has been made in lowering the mortality from this complication in the combat theater. For the first time the entire blood program has been thoroughly surveyed at the point of use in the combat theater, and the effects of transfusion on the clotting mechanism reviewed. The introduction of the plasma expanders into the combat theater has been supervised and their effectiveness in the seriously injured battle casualty established. This resulted in a potential decrease in the high incidence of homologous serum hepatitis. The characteristics of wounds and the sequence of bacteriologic and histologic changes have been described. The problems of resuscitation and massive transfusions have been analyzed, and recommendations made for better treatment.

These practical and valuable projects have demonstrated the function and proved the worth of field research. Therefore, the responsibility for acknowledging and developing the potentialities of field investigation no longer rests with the field research unit but with the leaders of the Army Medical Service.

THE MISSION OF FIELD RESEARCH

The primary mission of research in the field is to find better means of providing medical support to combat troops. From the practical standpoint, this consists of defining the problems and then solving them. The identification of the problems may require clinical, laboratory, and statistical studies. Questions such as "Does the stress of combat sometimes lead to adrenal insufficiency?" require considerable basic work, and the result may be merely to demonstrate that no problem in adrenal cortical function is detectable. There is no short cut to the identification of such problems. Similarly, if patients after massive transfusions demonstrate a mild bleeding tendency, the basic problem has not been identified until the clotting mechanism has been studied and the specific defect pinpointed. Thus basic research may be necessary in identifying and solving some of the problems. Basic research as a primary objective should seldom be undertaken in the field because of the inherent difficulties and cost involved. Such work can be better performed in the zone of the interior. The greatest contributions from combat surgical research will come from those studies directed toward therapy.

The second aspect of the mission is to report the findings immediately back to the combat theater and thereby permit the medical officers to keep abreast of developments. The third aspect of the mission is to report to the Research and Development Board those problems which require additional work in the clinics and laboratories in the zone of the interior. Thus the problems of field research will start in the front lines and extend through the entire chain of evacuation. The influence which such work will have on civilian thinking and practice is an additional benefit, but of secondary importance in the planning of the work.

METHODS OF OPERATION

The research program should be reviewed by the Coordinating Committee on Medical Sciences, Office of the Assistant Secretary of Defense (Research and Development) to ensure that the three military departments are informed of the research that is to be conducted, to ascertain whether triservice participation is indicated, to avoid unnecessary duplication, to enlist fiscal support, and to make available to the other services progress reports and ultimate results.

The areas of research conducted should be those directed by broad policy of the Department of Defense. The administration and technical support should follow directives of the sponsoring service responsible for the research team, and should be coordinated through the theater commander.

The chief of the Medical Research and Development Division, Office of the Surgeon General, Department of the Army, or of similar divisions of the Navy and Air Force, should provide over-all direction of effort and co-ordination, select personnel, and gain the co-operation of military and civilian establishments in the United States for development of teams and methods. This office should also assist in liaison between the work in the field and the work in military and civilian institutions in the zone of the interior. The direction must be very broad, for the specific direction and administration of the teams must remain in the field. The Army Medical Service Graduate School provided such an institution in which methods could be developed and personnel trained.

The surgical research unit in the field should be attached to a medical general laboratory for technical and logistic support. Because the mission of the theater laboratory is to support the field work, it should participate, as opportunity provides, in the technical projects of the research teams. A successful example of such an administrative arrangement is the attachment of the Far East medical research unit to the 406th Medical General Laboratory in Tokyo. The surgical research team was one part of the Far East medical research unit. The director of the theater medical research unit, or his deputy, should travel between various research units within the theater area, advising and assisting the members professionally and administratively. He should keep the army surgeon informed of work planned, work in progress, and work completed.

This liaison also provides an opportunity for the research units to use the perspective of the consultant staff of the field army and theater surgeons in planning research projects originating at the combat level. All reports from the field research units should be made to the director of the theater medical research unit, and through him to the theater and field army surgeon and to the director of surgical research in the zone of the interior.

The surgical research program as designed in Korea included an officer in the combat infantry division to study resuscitation and evacuation, a unit at a forward hospital to study the combat casualty during further resuscitation and primary surgery, and a unit at an evacuation hospital to study those patients who developed postoperative complications. In addition, certain casualties could be selectively evacuated to Tokyo Army Hospital and to Walter Reed Army Hospital for follow-up evaluation. This system requires limited extension. Added emphasis must be placed on the work in the infantry division, because it is at this level that most lives are lost. Furthermore, there should be a research unit in the communication zone working in co-operation

with the units in the combat area. This unit could be attached to a general hospital, but should be assigned to the medical research unit of the theater medical general laboratory. Thus overall direction and technical support is retained by the director of the theater medical research unit. In the Far East such a unit could be located at Tokyo Army Hospital and based on the Far East medical research unit and the 406th Medical General Laboratory for direction and support. This plan would permit a patient to be observed from the time he was wounded to the time he left the theater. The unit in the communication zone would provide a means of obtaining systematic follow-up in all clinical studies. Casualties could then be selectively evacuated to designated institutions in the zone of the interior for continued observation.

To ensure orientation of the program along the lines of finding and solving the practical problems, while protecting at all times the welfare of each casualty, the surgical research units should be under the immediate direction of a well-trained surgeon. He should direct the surgical research program at the field level and be directly responsible to the director of the theater medical research unit. If research is simultaneously in progress in other fields of medicine (epidemiology, psychiatry, et cetera) every effort must be made to overcome the limitations of travel and communication so as to maintain liaison with the work in progress by these groups. The field director in the zone of the interior should spend several months a year in the field. Consultants from civilian or other military installations, most effective shortly after the beginning of a project, should be available when special problems are encountered, as they are in a position to assist in the development of the project as related to technical approaches and emphasis.

Communication and travel are two of the most difficult obstacles in a combat theater. The routine monthly visits of the director, theater research unit, to each field unit would do much to overcome the handicaps of communication. Means of transportation should be assigned to the theater research unit for distribution to the various specialized groups. Travel orders should be issued which permit frequent travel between the units in the combat zone and between the combat and communication zone.

ORGANIZATION OF A SURGICAL RESEARCH UNIT

The surgical research unit should be prepared to study primarily the battle casualty, including investigation of the injury and the man's response to it, the tools and methods available

for his treatment, and when possible the wounding agents. With such a purpose, the team should consist of the following officers:

1. *Division level.* Surgeon.

2. *Surgical hospital level (mobile army).* Two or more surgeons, chemist, hematologist, anesthesiologist, physiologist (cardiovascular, and autonomic nervous system), pathologist, bacteriologist, and administrator (and supply officer).

3. *Evacuation hospital level (including renal failure center).* Two internists, surgeon, chemist, pathologist, and bacteriologist.

4. *Communication zone hospital (including further work in metabolism, renal failure, and surgery).* Specialized surgeons with laboratory support as required.

The findings of these men should ultimately be used in establishing policy. They should be assigned, therefore, to the theater medical research unit for a regular tour of duty with a minimum overseas tour of one year. In order to keep work integrated and creative, the members in the combat zone should return to the communication zone unit as necessary for a period of about one month. This time should be spent in developing methods, and writing reports of their observations. Thus the efficiency of the unit could be maintained without interruption of the over-all program.

Other officers could be assigned for shorter periods of time for special projects, as long as they did not affect policy. Officers in the communication zone unit should go to the combat zone whenever advisable. Technicians should include men trained in patient care, chemistry, hematology, bacteriology, blood typing, and photography. Each unit should have an officer or enlisted man with a knowledge of medical supply procedures.

THE INITIAL PHASE

The program of field research should have the support of the Assistant Secretary of Defense (Health and Medical), as well as the Assistant Secretary of Defense (Research and Development), and every officer in the armed services. This support should be formalized in a statement for distribution. Any project which has proved its ability to save limbs, lives, and millions of dollars is worthy of this support.

Initially, a unit should be organized in the zone of the interior, preferably in time of peace, and its general scope outlined in as much detail as possible. Prior to beginning work, the officers responsible for the unit and for its support in Washington, and an investigator with previous field experience should tour the

theater and select a site for operation. In selecting a site for research, priority should be given first to the assurance of the co-operation from the hospital commander, and second to the stability of the area. A slow, steady flow of patients offers the ideal opportunity for observation. An active front with frequent movement of the hospital is much less desirable. The officer responsible for the unit, a chemist, and an administrative-supply officer should begin work in the field about two months before the arrival of the rest of the team. The second group can bring whatever equipment is not available in the theater.

OPERATIVE PHASE

The stability of the front lines will determine to a large extent the type of research that can be performed. If the lines are stable, as was the condition during the last 20 months in Korea, an adequately equipped laboratory can be maintained at a forward hospital. If the hospitals are moving frequently the work must be limited more to the operative field, to resuscitation, evacuation, effect of drugs, and the collection of specimens for shipment to other laboratories.

Much more could be accomplished if adequate follow-up of patients could be achieved, as was done in neurosurgery and vascular surgery, by the selective evacuation to hospitals in the communication zone and the zone of the interior. Thus the forward surgical procedures could be rapidly altered as indicated by subsequent results. Such a program is essential to the improvement of all phases of traumatic surgery. The program would rapidly pay its way by increasing the effectiveness of early treatment. The research units outlined above would permit such a selective follow-up.

Constant summarizing of the work in progress is essential for two reasons; first, to maintain continued perspective and direction of effort, and second, to provide information to the theater as each project is completed. In this way, recommendations designed to improve the care of the wounded soldier are instituted immediately in the combat zone. This provides the theater medical service with the advantage of the most advanced experience, and gives the research team adequate observation of the general applicability of their recommendations.

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THE UNSUITABLE ENLISTED SEAMAN

WILLIAM K. GOODSPEED, *Lieutenant Commander (MC) USNR*
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A TOUR of military duty has become an accepted part of life in these United States for physically and mentally fit young men. Existing regulations clearly outline the minimum physical standards, and mental standards are based on the Armed Forces Qualification Test (AFQT) which is a good objective measurement of ability to learn. There remains a significant group of men who meet these minimum physical and mental standards, and who enlist or are inducted into the armed services, but who are found to be unsuitable for service and shortly after entry are discharged. These men are of no value to the service because during their short tours of duty they contribute nothing to the over-all function of the Department of Defense. The processes of induction or enlistment, transportation to Reception Centers, initial classification and assignment to training groups, issuing of uniforms and equipment, trial of duty, establishment of the diagnosis of inadequacy, preparation for discharge, and finally transportation back home—all represent a wasted expense in money and effort.

In addition to the cost to the Government, the effect of this abortive attempt at military life on the person must be considered. These men are on the borderline of adjustment to civil life, and the whole fruitless process of entry into and rapid discharge from the service represents a great personal failure. They are left with the stigma of "unsuitable" while the remainder of the male population is experiencing an emotional maturation in the armed services. There is no question that these men are not suited for the rigors of military life, but their adjustment to civilian life may be jeopardized by an unsuccessful encounter with military service.

From what has been said, it can be seen that the interests of the Government and the persons concerned would be best served if these men were screened out prior to entry. With this objective in mind, a survey of the men who enlisted through this station

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and were discharged as unsuitable for service was undertaken. As Hamburg and others[4] have suggested, such persons "provide a logical focus for psychiatric screening research."

MATERIALS AND METHODS

The records of all men who were enlisted through this station between November 1951 and July 1954 and subsequently discharged as unsuitable for military service were examined. The records available for review consisted of two groups: (1) Preenlistment papers consisting of an application for enlistment, character and employment references, verification of birth record, police checks, and an Armed Forces Examining Station letter of qualification containing the results of the AFQT and a physical examination; and (2) a report of Aptitude Board proceedings which contained the following information obtained while the man was in service: length of service, General Classification Test (GCT) score, intelligence quotient (IQ) where applicable, and a description of personality and performance while in service. A comparison of these two groups of papers forms the basis for this study.

During the period of this study all men enlisted at this station were sent to the U. S. Naval Training Center, San Diego, Calif., for recruit training and we wish to emphasize that the inservice information, including the personality descriptions, was obtained from copies of the Aptitude Board proceedings which are sent routinely to the activity at which a man was enlisted. These tests and psychiatric descriptions are not our work but that of the Psychiatric Unit and the Aptitude Board of the training center at San Diego.

RESULTS

During the period of this study, 4,746 men were enlisted at this station, and 97 (2.2 percent) were discharged as unsuitable for military service.

The average age was 18.3 years (with a range of 17 through 28). The parents of 70 men (72 percent) were living together. One or both parents of 24 men (24.7 percent) were dead or separated at the time of enlistment. No information was available in three cases. Ninety men (93 percent) were caucasians, six were Negroes, and one was not recorded. Sixty men (61 percent) were raised in rural areas, 34 in cities, and unknown in three. The lowest grade completed in school was the 5th, the highest was the 12th, and the average completed grade was the 9th.

Fifty-eight men (49.4 percent) were in the lowest AFQT group (IV) and were classified as poor learners, 19 men (19.5 percent) were in the AFQT Group III and were classified as average

learners, seven men were in AFQT Group II and were rapid learners, and one man was in AFQT Group I and was a very rapid learner. AFQT results were obtained on 73 men and the average percentile was 27.2. Among the 25 men given an IQ test, the range in score was from 57 to 103.

The average number of siblings was 3.6 (0 to 9). Ten men had an evaluation in one of their three character references that was something less than "good" or "fair." Six men had minor police records (mostly traffic violations), and two had poor school or employment references.

One man was in the National Guard and one was in the naval reserve, but neither had had active duty; one was in the National Guard and had served two years on active duty with the United States Army, and one man had spent three years in the Maritime Service during World War II.

The results of the data obtained while in the service reveal that the average length of service was 58.5 days (14 to 234), and the average GCT score was 39.2 (22 to 66). The psychiatric descriptions listed 68 men as immature, 48 as inadequate, 32 as dull, 20 as dependent, 19 as anxious, 19 as hypochondriacal, 11 as schizoid, eight as hostile, and three as effeminate. Most men had more than one of these terms used in the description.

Thirty-seven men (38 percent) were observed to be enuretic. This persisted in spite of frequent wakings during the night. Four men were absent without leave during recruit training, two were somnambulant, and two attempted suicide.

DISCUSSION

This study was undertaken with the hope that a comparison of the two sets of data would reveal some basis for rejecting men unsuitable for service prior to entry. From a theoretic standpoint, such a basis for screening unsuitable applicants should have the following characteristics: (1) No applicants should be rejected who would make a successful adjustment to military life; (2) the screening process should be easily applicable to large numbers of people, and capable of uniform interpretation when applied at various locations throughout the country; and (3) the screening process should be of such character that it is applicable both to those who are motivated to enter the service and to those who are opposed to it.

The general conclusion of other investigators has been that each person's performance prior to entry into the service should be screened before induction. The data routinely collected consists of police checks and character and work references. These records show minor defects in 18 of the men examined in this

study; thus, stringent scrutiny of the records might have prevented the induction of 18 percent of the men in this group. It is not known, however, how many suitable seamen might have been rejected through such a screening for similar minor defects.

On superficial inspection, it might seem that enuresis would be a good reason for rejection. It should be noted, however, that all 37 men who were discharged as enuretic failed to give a history of enuresis at the time of enlistment. After entering the service these men claimed to be enuretic prior to enlistment, but because they desired to enlist they concealed this information at the time of enlistment. For men who were motivated to remain out of the service, it would be simple to assure rejection by claiming to be enuretic. Thus a history of enuresis would be a poor basis for rejection because it could so easily be claimed by those desiring to be rejected for service.

Adequate screening might be accomplished on the basis of a careful search for the personality characteristics described on the Aptitude Board records. The most frequent characteristics were immaturity and inadequacy. We do not know how many "immature" and "inadequate" men were able to make a successful adjustment and are now contributing to the defense of the country. Because the average age of the men in this study was 18, it is to be expected that many of them will be labeled immature. The process of recruit training has been a stimulus to the development of maturity to many in the present generation of American men, and it would be unwise to reject all men who evidenced immaturity. This might be a basis for rejection if the degree of immaturity could be accurately and objectively measured, but we know of no such test.

The problem might be solved by more careful scrutiny of each man's preservice achievement, but there are many practical difficulties. These men are very young and have not had time to accomplish much before they enter the service. The obvious failures are eliminated by police checks and character, school, and employment references. The mentally unfit are eliminated by the AFQT, but this does not eliminate those who cannot adjust to recruit training because only 50 percent of these men were in the lowest AFQT group.

In short, none of the procedures in present use are adequate in screening out these men before they enter the service. More research is needed on the value of specific tests and procedures which would screen out those who are unsuitable for military service.

SUMMARY AND CONCLUSIONS

Preservice and inservice data are presented on 97 men enlisted in the United States Navy through this station who were sub-

sequently discharged as unsuitable for military service. None of the data contained in this report meets the requirements of an adequate basis for rejection of these men. There is a clear need for more work in this field.

REFERENCE

1. Hamburg, D. A.; Baskin, T. G.; and Tucker, A. C.: Prediction of immediate psychiatric breakdown in military service. *U. S. Armed Forces M. J.* 5: 625-636, May 1954.

RESEARCH IDEAS ENCOURAGED

The Committee on Disaster Studies of the National Academy of Sciences-National Research Council, in a recent meeting, emphasized the need to encourage research by competent representatives of the social sciences and related disciplines who wish to advance knowledge in their own fields and contribute to the solution of disaster problems.

The Committee is interested in the effects of disaster upon individuals, groups, communities, and societies; human response to the threat and impact of disaster, ranging from the individual to the national level; the human aspects of such problems as communications, warning organization, rescue, welfare, medical care, evacuation, and logistics; and the long-term effects and recovery problems of disaster.

The Committee can support this development to a limited extent by providing financial assistance for investigations and analyses. Assistance will be similar to grants-in-aid and will normally range from $200 to $2,000. Projects requiring larger sums, which are especially meritorious and pertinent to the Committee's interests, can be considered. Proposals from graduate students, faculty members, and other qualified investigators will be entertained.

Inquiries should be directed to the Committee on Disaster Studies, Division of Anthropology and Psychology, National Academy of Science-National Research Council, 2101 Constitution Avenue, Washington, D. C.

Clinicopathologic Conference

Madigan Army Hospital, Tacoma, Wash.*

HYPERTENSION AND HYPERGLYCEMIA

Summary of Clinical History. A 36-year-old woman (gravida 5, para 3, abortus 1) entered the hospital 11 June 1953, having been referred because of elevated blood pressure and ankle edema during a current pregnancy.

The patient's last menstrual period was 4 October 1952 and the expected date of confinement was 7 July 1953. She had had ankle edema for a period of four months, and had been on a salt-free diet for six weeks. Three weeks prior to admission she was informed by a civilian physician that she had high blood pressure and a three-plus reaction for urinary albumin. The physician's records of her last office visit on 6 June 1953 revealed: Weight, 155 pounds (normal weight 139 pounds); blood pressure, 138/88 mm. Hg with a trace of albumin in the urine; and 6 to 8 white blood cells per high power field. The previous pregnancy, which terminated with the delivery of a healthy girl on 13 June 1952, was uncomplicated except for moderate ankle edema. The blood pressure and urinalysis were within normal limits. All previous pregnancies had been uncomplicated except for one abortion in 1945 at the end of the first trimester. The family history was essentially negative except that the patient's mother died at the age of 58 years of a "stroke."

Physical Examination. The patient was a well-developed, well-nourished white woman who was co-operative and alert. Her temperature was 98.4° F. and her weight, 154½ pounds. Examination of the eyes, nose, and throat were noncontributory. The oral mucosa and teeth were in good repair. The chest was clear to auscultation and percussion. The breasts were enlarged and the areolae and nipples were prominent. There was no cardiomegaly. The heart rate was 92, regular, and the blood pressure was 174/100 mm. Hg. Normal heart sounds were present. The uterus was

*Brig. Gen. Emery E. Alling, MC, USA, Commanding General. From the Surgical Service, Col. James E. Graham, MC, USA, Chief.

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TABLE 1. *Blood chemical analyses (all electrolyte values are recorded in milli-equivalents)*

	12 June	17 June	22 June	23 June	24 June	26 June	29 June
Blood urea nitrogen	9.0	9.0			12.0		
Carbon dioxide	21.0	21.4	25.0	25.4	26.8		
Chloride	107.0	111.0	99.0	96.0	111.0	115.0	
Sodium					148.0		
Potassium			3.2	2.9	3.9	4.0	
Calcium			5.2	5.0	4.6		
Phosphorus					1.2		
Protein (grams per 100 ml.)		4.98* (A-2.37, G-2.61)			4.98* (A-1.42, G-3.56)		4.27* (A-1.42, G-2.85)

*Albumin-globulin ratio.

enlarged in keeping with the duration of the pregnancy. The fetus was active in a vertex presentation, head floating, and fetal heart tones were 140 per minute and regular. The head was palpable in the left lower quadrant. No other abdominal masses were noted. The external genitalia were negative. Vaginal examination was not performed. External hemorrhoids were present. There was a three-plus pitting edema of the feet and ankles. Neurologic examination was negative. The skin revealed no lesions.

TABLE 2. *Blood sugar determinations*

Date (1953)	Mg. per 100 ml.	Date (1953)	Mg. per 100 ml.
16 June	40, 169	29 June	146
22 June	170, 40, 42	30 June	119
23 June	228	1 July	134
24 June	146, 62	2 July	85
25 June	212, 296, 300	3 July	118
26 June	188, 240	4 July	200
27 June	166	5 July	97
28 June	168		

Laboratory Findings. The hematocrit was 39 on 12 June, and 12 days later was 46. On 24 June the white blood cell count was 15,800 with 79 percent neutrophils and 21 percent lymphocytes.

Repeated urinalyses revealed a specific gravity from 1.007 to 1.021; albumin from a trace to three-plus; and sugar from negative to four-plus. Numerous red and white blood cells were seen in most specimens. Granular casts were found on 4 and 5 July. A Sulkowitch test was moderately positive. The results of repeated blood chemical analyses are shown in table 1; blood sugar determinations are shown separately in table 2.

A serologic test for syphilis was negative, as was a spinal fluid culture on 25 June. Urine culture (6 July) revealed pseudomonas species, and on 8 July *Pseudomonas aeruginosa* and alpha streptococci were isolated from a culture of sputum from the trachea.

Roentgenograms of the chest and abdomen on 26 June were within normal limits.

Course in Hospital. From 11 to 15 June the patient was placed on a salt-free diet. With a moderate diuresis her weight dropped to 146 pounds. The blood pressure during this period ranged between 174/110 to 156/80 mm. Hg. The temperature was normal.

On 16 June the patient was found at 0800 hours in a semiconscious state. She responded to stimulation but was disoriented. An examination revealed a left hemiparesis with diminished tendon reflexes, and an equivocal Babinski sign on the left. The pulse was 100 per minute and the blood pressure was 210/120 mm. Hg. During this period she perspired profusely and exhibited a generalized slight tremor. At 0915 hours the blood sugar was 40 mg. per 100 ml., and an intravenous infusion of a 5 percent solution of dextrose was started. By 1000 hours the blood pressure was 160/110 mm. Hg. The patient was conscious and moved about freely, although she was still somewhat irrational. There was no residual paresis and she made an uneventful recovery.

On 21 June the patient's condition was considered to be satisfactory for the induction of labor. The patient was fully prepared for labor when, at 0815 hours, she had another episode similar to that experienced on 16 June. The blood pressure was 172/104 mm. Hg and the pulse, 115. She was given 15 cc. of a 50 percent solution of dextrose intravenously and a glass of orange juice and recovered promptly without residual neurologic findings. A sterile vaginal examination revealed the cervix dilated 3 cm. with 40 percent effacement. The membranes were ruptured artificially and at 1400 hours the patient was delivered of a six-pound, 10-ounce, normal male infant.

At 2300 hours the patient developed another episode similar to that of 16 June. On this occasion it was associated with a convulsion and coma. She seemed more confused and irrational with this episode, but recovered. The temperature rose to 101° F. (rectal) during the day. Another crisis similar to that noted on previous occasions was experienced at 0200 hours. The blood pressure was 180/98 mm. Hg. The patient was seen by the medical staff and a firm, somewhat movable, smooth mass was detected in the left upper quadrant, extending nearly to the midline 6 cm. below the left costal margin. It was believed that this did not represent the spleen.

The patient remained comatose in spite of a continuous intravenous infusion of a 10 percent solution of dextrose, and the blood pressure ranged between 195/90 and 160/90 mm. Hg. She had repeated convulsions, most marked on the right side, with profuse sweating. On 23 June her condition remained unchanged and convulsive movements, largely in the right arm, neck, and face, were noted. The electrocardiographic findings were reported as follows: "Rate, 140; lowering of T waves, P waves merged, change compatible with hypokalemia." The blood chemistry varied as indicated under the laboratory findings (table 1). The patient was digitalized. On 24 June her condition was essentially

unchanged. The deep reflexes were normal. Mild sedation was continued. The electrocardiographic record was less suggestive of hypokalemia. On the morning of 25 June the patient's condition was considered somewhat improved. Later in the day, however, evidence of phlebitis in the right leg developed and her temperature rose to 105.6° F. (rectal). The blood pressure varied from 140/90 to 152/76 mm. Hg. From 4 to 6 July the patient had numerous bowel movements. The stools were greenish and semifluid in character. She was irrational during this period and frequently revealed muscular twitching on the right side of the face. On 6 July cyanosis was noted and she was placed in an oxygen tent. On 7 July the temperature was 102° F. (rectal) and the pulse was 112. The blood pressure ranged between 126/80 and 152/76 mm. Hg. During the patient's entire febrile period, streptomycin and aureomycin had been given without apparent therapeutic effect. On 8 July the temperature was 103° F. (rectal) and the pulse had increased to 160. The blood pressure, however, dropped below 80/40 mm. Hg and responded only temporarily to a continuous intravenous drip of norepinephrine. During the afternoon of 8 July the patient's diastolic blood pressure continued to drop and there was marked cyanosis of the skin. The patient was pronounced dead at 1535 hours, 8 July 1953.

DISCUSSION

Doctor Butz:* Would you show the roentgenograms, Doctor Shippey?

Doctor Shippey:** We have a roentgenogram taken of the chest on 26 June 1953. The film is essentially normal. No evidence of consolidation is present within the lungs. A flat film of the abdomen shows a small amount of gas in the bowel but there is no evidence of calcification or obstruction. We fail to outline sufficiently the clinically reported tumor mass.

Doctor Butz: Doctor Dickerson, will you present the interpretation of the electrocardiogram?

Doctor Dickerson:*** I think these electrocardiograms are of note, particularly by reason of what they don't show, and by reason that what they establish had not occurred prior to this patient's hospitalization. For one thing, you can say that this patient did not have heart disease insofar as one might have expected a possible history of hypertensive cardiovascular disease in the past. The record in no way suggests long-standing hypertension. On 23 June there was an apparent prolongation of the Q-T interval which is consistent with, but not diagnostic of, hypokalemia. The next two days there appears to have been improvement,

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**Maj. Norman E. Shippey, MC, USA, Chief of Radiology Service.

***Lt. Col. Robert B. Dickerson, MC, USA, Chief of Cardiology Service, Medical Department.

but then comes 26 June and something clearly happened at that time. This is one of the circumstances which is not too frequently encountered in clinicopathologic conferences where, instead of asking, you can say to the pathologist, "Did you find the pulmonary infarct?" There were upright QRS complexes in lead I on 22, 23, and 25 June, and then they were clearly reversed on 26 June. The electrocardiograms also revealed a tremendous degree of right axis deviation on that date; and the fact that this was not an artefact was attested to by the slow but gradual return toward the normal picture. There was some improvement on 29 June and by the time of the last tracing on 6 July the record was much like the normal initial tracing of 22 June. So again in summary, this patient had not had a long history of hypertension. There was nothing to suggest cardiovascular renal disease so far as it might have been reflected in the electrocardiogram. Finally there is every reason to believe that on 26 June the patient suffered a pulmonary embolism. The prolongation of the Q-T interval is regarded as consistent with altered electrolyte balance as attested to by the low serum potassium.

Dr. Butz: Dr. Woollcott, would you discuss the differential diagnosis in this case?

Doctor Woollcott:* The story of this woman's illness follows a rapid and progressive course, beginning with symptoms of toxemia and progressing to convulsive attacks which occurred repeatedly and uncontrollably until the death of the patient. There was no previous history of essential hypertension or attacks similar to those described during her present illness.

There are several features we must explain by our diagnosis in this case—the hypertension, the convulsive attacks, the neurologic signs, heart failure, the abdominal mass, and some rather bizarre laboratory findings. The first and most obvious diagnosis to consider is eclampsia. Eclampsia could have accounted for the hypertension, the swelling, the strokelike episodes, and the heart failure. But there is no way of explaining the mass in the left upper quadrant with that diagnosis. For this reason I am going to dismiss the diagnosis of eclampsia, at least as a primary diagnosis, and because the mass in the abdomen is the striking clinical finding in this case I am going to anchor my differential diagnosis around it.

The mass was described as smooth, movable, and located in the left upper quadrant of the abdomen extending almost to the midline, 6 cm. below the costal margin. What organs or tissues could cause a mass of this description?

The possibility of a pelvic tumor, perhaps a parasitic fibroid, should be considered. I know of no way to rule this out. However, pelvic examinations were apparently negative during her pregnancy. The medical

*1st Lt. Philip Woollcott, Jr., MC, USA, Intern.

officers in attendance believed that the mass was not spleen. There was no lymphadenopathy or blood changes to suggest lymphoma or hypersplenism. Likewise, I shall exclude tumor of the stomach because there is nothing in the woman's history to suggest that diagnosis. What about the liver? From my understanding of the position of the mass it would not likely be liver, although presumably a tumor of the left lobe of the liver, particularly if cystic, such as in hydatid disease, might protrude into the left upper quadrant; but its true nature can usually be perceived by virtue of its descent on inspiration. What about tumors of the kidney? The only tumor of the kidney I would consider in this case would be carcinoma or hypernephroma. Hypernephroma of the kidney, which is the most common kidney neoplasm in adults, might very well account for a mass of this size in the abdomen. There was microscopic hematuria to support this diagnosis. Against a diagnosis of this tumor is the fact that hypernephroma is rarely found before the age of 40 years, and it is twice as common in males as in females. Also, there are too many clinical aspects of this case left unanswered by that diagnosis.

What about the pancreas? Pancreatic cysts are palpable in nine cases out of 10 and are usually found in the epigastrium to the left of the midline; they could account for this mass, as could cysts of the omentum and mesentery. The latter are characterized by spherical shape and extreme mobility. Neither of these diagnoses seems likely in this case. Carcinoma of the pancreas I shall likewise rule out. A carcinoma of the pancreas of this size would probably have produced other signs of malignant extension or metastasis, such as jaundice.

What about adenoma of the islet cells of the pancreas? These are usually small tumors but have been reported as large as 13 by 15 cm. in diameter. I was not able to find a case of palpable islet cell tumor in the literature, but there are three case reports of islet cell adenoma complicating pregnancy in the literature.[1,2] In 1946 Pompen and others reported a case in Holland which bears a striking similarity to this case in many respects. Their patient had repeated episodes of loss of consciousness, perspiration, blurred vision, slurred speech, mental confusion, headache, elevated blood pressure of 150/100 mm. Hg, and a transient hemiparesis. These attacks in their patient were associated with depression of the blood sugar below 50 mg. per 100 ml. Glucose tolerance tests resulted in blood sugar values as high as 257 mg. per 100 ml.; thus it would appear that the high blood sugar levels, as in our patient, would not necessarily rule out islet cell tumor. Cattell and Warren[3] have pointed out the fact that the so-called flat glucose tolerance curve, long associated with organic hyperinsulinism, is not a constant and reliable finding. Between our patient and the patients with islet cell tumor complicating pregnancy in the literature there are some interesting discrepancies. All three cases in the literature occurred post partum. The patients' symptoms were relieved during the pregnancy. Their symptoms had been thought present prior to preg-

nancy, and their blood sugar levels were at some time much lower than in our patient—as low as 20 mg. per 100 ml.

This woman, however, had many clinical signs and symptoms of hyperinsulinism. First of all she had hypoglycemia, 40 mg. per 100 ml. on one occasion, and 50 mg. per 100 ml. on two others. Secondly, she had the clinical features of a severe hypoglycemic attack—tachycardia, faintness, sweating, convulsions, and coma. Her first attack occurred in the morning, presumably following an overnight fast. This is typical of a hypoglycemic attack. Thirdly, this patient's second attack responded almost immediately to 15 cc. of a 50 percent solution of dextrose and orange juice. This is characteristic of hyperinsulinism caused by islet cell tumor. These three criteria, the hypoglycemia below 50 mg. per 100 ml., the clinical attack of hypoglycemia in the fasting state, and the rapid recovery following the administration of dextrose and sugar, are those used by Whipple[4] as a guide for determining which patients require surgical exploration. Conn[5] has emphasized that when the previous diet has been normal, depression of the postabsorptive blood sugar value below 50 mg. per 100 ml. means hyperinsulinism with but few exceptions. He goes on, however, to point out that a level below 50 mg. per 100 ml. is not too important if the blood sample is taken following several days of subnormal carbohydrate intake; we cannot rule out the latter in our patient. Duncan[6] states that in true islet cell tumor producing hyperinsulinism the blood sugar will usually reach levels as low as 35 mg. per 100 ml. at some time during the illness. Islet cell tumor remains a possible diagnosis in this case mainly because it best explains the hypoglycemic episodes.

Against the diagnosis of islet cell tumor is, first of all, the size. Islet cell tumors are rarely larger than 2 to 3 cm. in diameter. Secondly, and this is very important, *there were no low blood sugar values during the last two weeks of this patient's illness despite the fact that she was having repeated attacks.* Thirdly, we would have to add a second diagnosis of toxemia to explain the hypertension. Fourthly, it would be a *lazy* islet cell tumor that would allow the blood sugar to rise to 300 mg. per 100 ml.

So if we do not choose the islet cell tumor, how else are we going to explain this patient's low blood sugar levels? What other conditions may cause hypoglycemia? Severe liver disease is a possibility. This patient had a reversal of the albumin-globulin ratio with marked depression of the albumin fraction; a labile blood sugar level following the intravenous administration of dextrose as found in liver disease, but she had no history of jaundice or other signs or symptoms of liver disease. No liver function tests are reported in the protocol. Hypofunction of the adrenal cortex can produce hypoglycemia but this patient clinically had nothing to suggest Addison's disease. Hypopituitarism may cause hypoglycemia. We have nothing to support pituitary disease in this patient. There are no skull roentgenograms. Her pregnancy itself makes

pituitary dysfunction unlikely. Hypoglycemia may be caused by functional hyperinsulinism. It is found in persons with anatomic nervous system imbalance. Pregnancy and lactation *per se* have been recorded as causing hypoglycemia. A possible explanation of this patient's hypoglycemia may be either an insufficient carbohydrate intake prior to her admission or while she was on a salt-free diet, or a functional hypoglycemia as the result of her pregnancy. The possibility should also be mentioned that the hypoglycemia may be the result rather than the cause of the convulsions. Hypoglycemia does occur following epileptic seizures, for example.

What about adrenal tumors as the cause of this mass? There is nothing to suggest a carcinoma of the adrenal cortex in this patient. Carcinoma and the functional tumors of the adrenal cortex rarely become large enough to be palpated in the abdomen. The only adrenal tumor which I shall discuss, the only adrenal tumor that does become large enough to be palpated, is the tumor of the chromaffin cells of the adrenal medulla, pheochromocytoma. Pheochromocytomas may grow to a large size and occasionally can be palpated through the abdominal wall. Six patients with pheochromocytoma complicating pregnancy have been reported.[7] This tumor is usually manifested by paroxysmal attacks of hypertension alternating with normal blood pressure levels; however, sustained hypertension has been reported in almost half of the patients. The attacks are caused by the discharge of epinephrine and norepinephrine into the systemic circulation from the tumor. These attacks are sometimes provoked by massage of the tumor, bending forward or backward, injections, operations, and sometimes emotional stress. We can well understand how manipulation of this gravely ill woman during and after her delivery might have precipitated an attack. It would be interesting to know if this woman had had previous attacks of palpitation, headaches, or faintness before her pregnancy; there is no information in the protocol suggesting these symptoms. However, I would suspect their occurrence if this woman had pheochromocytoma.

This woman's attacks are characteristic of this tumor: hypertension, faintness, headaches, sweating, the pale cyanotic skin, and the dyspnea and glycosuria. There is no mention of precordial pain, which is often present. The pulse may be greatly accelerated, but very often is not. Brachycardia may occur and has been reported. The hyperglycemic levels during the last two weeks of her life are characteristic of pheochromocytoma and may be due to epinephrine. Cardiac failure is the most common, and one of the most serious, sequelae of pheochromocytoma. This woman apparently had signs of heart failure and was digitalized. I would feel much more secure in the diagnosis of pheochromocytoma if a benzodioxane or histamine test had been performed. A roentgenogram of the abdomen was reported as negative. Roentgenographic examination following perirenal air inflation is useful to outline these tumors.

There is no way that I can be certain that this woman did not have both pheochromocytoma and toxemia of pregnancy. Bowen and others,[7] in their report of a case of pheochromocytoma complicating pregnancy, point out the obvious similarity between these two syndromes and the fact that the pheochromocytoma is usually found in women between the ages of 20 to 40 years—that is, the child-bearing era.

I believe the abdominal mass was a pheochromocytoma. I do not believe this patient had a primary renal disease, although the autopsy may prove me wrong. The urinalysis on the first day of admission was essentially normal. Terminally, she had a urinary tract infection as well as a possible colitis or enterocolitis. The symptoms of the latter, however, the diarrhea with watery stools, may have been the result of aureomycin therapy. The patient probably had a terminal bronchopneumonia. Thrombophlebitis also occurred. There was a possibility also of a pulmonary infarct although the patient had no clinical signs to suggest it, such as hemoptysis or sudden chest pain. However, the electrocardiographic findings brought out by Doctor Dickerson add more light on this diagnosis. This woman was bedridden and gravely ill. I believe these infectious processes were like salt in an already fatal wound. I believe the cause of death was a cerebral vascular accident, probably cerebral hemorrhage, suffered during one of her hypertensive episodes. Cerebral vascular accidents usually do not cause sudden death except with rupture of a large basilar aneurysm. I believe she probably had a cerebral hemorrhage before her death. The increased respiratory and pulse rate and the rise in temperature are characteristic of the last 24 to 48 hours of life, following a fatal cerebral vascular accident. The transient elevation of the blood sugar, the glycosuria, and also the albumin and casts in the urine are compatible with a cerebrovascular accident. The hypokalemia was probably due to the diuresis associated with prolonged intravenous administration of dextrose in the absence of adequate protein and salt intake. I do not believe the low potassium was responsible for the signs of heart failure although it was probably an aggravating factor.

Dr. Woollcott's diagnoses:

1. Pheochromocytoma, left adrenal
2. Cerebral hemorrhage and heart failure

Doctor Dickerson: I am curious as to why so much attention was paid to this abdominal mass. This woman came to the hospital on 11 June and was not found to have the mass. She became gravely ill and was delivered, but still it was not discovered. Two weeks after admission, when medical consultation was requested, somebody on the medical staff said that they thought they felt an abdominal mass which didn't show on the roentgenograms. Isn't that a kind of red herring?

Doctor Woollcott: Well, my thoughts on that were that the abdominal tumor described here was there all the time. While the woman was pregnant and before delivery the fetus was in the anterior portion of the abdomen, and the tumor, if it was a pheochromocytoma, was retroperitoneal. After delivery, with the expulsion of the fetus and contraction of the uterus, this tumor may have come forward to a position where it could be palpated.

Doctor Scheyer:* I think we should congratulate these interns for their very subtle study of this case. They found almost everything that could be thought of and make it difficult to discuss the case further. It was said that we should think of a pelvic tumor which was felt in the upper part of the abdomen as having connection with the genital organs. Usually we do not find an ovarian cyst so far up in the abdomen but I remember one patient in whom one was encountered. The only ovarian tumor that I know of which might affect blood pressure or blood-sugar is an arrehenoblastoma. I agree with Doctor Woollcott that the possibility exists that pre-eclampsia and eclampsia existed together with this tumor, which most likely took origin from the adrenal gland.

Diabetes mellitus also has a tendency to produce hypertension and mimic the symptoms of pre-eclampsia. In addition, there is a very high percentage of diabetic patients who develop true toxemia. In association with diabetes Kimmelstiel-Wilson syndrome, a specific renal disease associated with long-standing diabetes, should be considered. In this syndrome we find intercapillary glomerulosclerosis with noninflammatory focal fibrosis of the glomerular tufts. The chief clinical symptoms are moderate to massive proteinuria, hypoproteinemia, edema, and hypertension in combination with diabetes. To exclude this possibility ophthalmoscopic examination would have been helpful because in long-standing diabetes the fundus usually shows angiospastic phenomena with restriction of vision. There is no doubt that some of the symptoms we find in this case could have been caused by a hypertensive crisis.

I believe a tumor of the adrenal gland was the cause of this patient's symptoms. It has been stated that in pregnancy pheochromocytoma causes severe pre-eclampsia or eclampsia which is always connected with some degree of shock. A feature that was not mentioned before about pheochromocytoma is that there are two different clinical groups. One group has periodic hypertensive attacks and the other group has persistent hypertension. In a thousand lumbar sympathectomies for hypertension at least six pheochromocytomas and still more tumors of the adrenal cortex were found.

I usually use the phentolamine methanesulfonate (regitine methanesulfonate) test to help with the diagnosis. Phentolamine methanesulfonate is a potent anti-adrenergic drug whose pharmacologic action facilitates the diagnosis of pheochromocytoma. It is also used for interim

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medical management of patients with pheochromocytoma to prevent paroxysmal attacks prior to definitive surgery.

Doctor Horner:* I am sure we all have seen patients in whom a postpartum convulsion may be the result and only manifestation of a postpartum eclampsia. This usually occurs within a few hours of delivery but can occur as late as three or four days. I've seen a patient that had her first convulsion on the third postpartum day. Certainly eclampsia is a diagnosis to consider and I would not dismiss it as lightly as did Doctor Woollcott. Edema, hypertension, and convulsions definitely point toward that disease. Against this diagnosis are the mass which was present, the fact that the patient had previous normal pregnancies, a urine relatively free of albumin, carbon dioxide within normal limits, episodes of hypoglycemia and hyperglycemia, and the fact that the disease progressed in spite of treatment and evacuation of the uterus.

Another possibility which I do not believe has been mentioned specifically is essential hypertension with superimposed toxemia. Again, an adequate urine concentration and a normal blood urea nitrogen, the fact that she had an average-size baby, and that the mass was present would militate against this diagnosis. Pancreatic tumor and hypernephroma as well as cerebral tumors are all possibilities; however, I think they are so rarely associated with pregnancy that they can be dismissed. Diabetes associated with toxemia is a possibility. It is very common that a diabetic mother will develop toxemia during pregnancy. The convulsions which the patient had may have represented diabetic coma or insulin shock. Thus, pheochromocytoma remains the diagnosis of choice. The age of the patient, the attacks of hypertension associated with changes in blood sugar levels, the sweating and tremors, and finally the resultant neurologic manifestations reinforce this opinion. The phentolamine methanesulfonate test Doctor Scheyer spoke of, or the benzodioxane test which I am more familiar with, would have helped in the diagnosis. Bowen and associates, as mentioned by Doctor Woollcott, have reported one case of pheochromocytoma in pregnancy. They emphasized that the similarity between pheochromocytoma and toxemia is so close that it is almost impossible to differentiate the two entities. As far as the chemical tests are concerned, they mentioned the use of the histamine, tetraethylammonium chloride, epinephrine insensitivity, and benzodioxane tests. None of these tests was performed in our case except, unknowingly, the epinephrine insensitivity test. At one time the patient was given norepinephrine intravenously and yet she did not respond very well. If the clinician had been more alert he might have given a hint as to the patient's difficulty. One must agree with Doctor Woollcott as to the final diagnosis, namely, that she had a pheochromocytoma with one or more cerebrovascular accidents.

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Doctor Butz: Does anybody have any remarks in addition to or in conflict with any of the ideas presented? I would like to ask a question now. The clinicians knew the patient had a mass in the abdomen. What was the one thing that could have been done if her physical condition had improved?

Doctor Horner: Exploratory laparotomy.

Doctor Butz: That's right. An exploratory laparotomy was imperative. The question was how to enable her to tolerate the procedure. This was never accomplished. The benzodioxane test is very fine but not always safe in a moribund patient. Now I would like to ask another question. What's the difference between epinephrine and norepinephrine physiologically?

Doctor Woollcott: I am not certain of that, but epinephrine increases cardiac rate whereas norepinephrine has less effect on this. There may be a mixture of the two and the tumor may secrete one predominantly over the other, which explains the variation of the pulse rate in these patients with pheochromocytoma.

Doctor Butz: That is right, in addition to the fact that norepinephrine does not influence basal metabolism or glycogenolysis.

Doctor Horner: Would Doctor Dickerson comment on the change from hyperglycemia to hypoglycemia, assuming that the patient had a pheochromocytoma?

Doctor Dickerson: Yes, I think that is essentially a manifestation of normal function of the pancreas that has been described. It is basically the compensating reaction of a suddenly stimulated pancreas. For example, in children, coma is occasionally observed when the only obtainable history is that the youngster surreptitiously ate a whole jar of preserves alone; *i. e.*, his pancreas has secreted an excessive amount of insulin because of its sudden profound stimulation.

PATHOLOGIC FINDINGS

Doctor Butz: At autopsy a large pheochromocytoma (fig. 1) of the left adrenal was found. This tumor weighed 690 grams. The left frontal lobe of the brain showed many foci of the ischemic necrosis accounting for the right hemiparalysis. There was a thrombus of the right tibial and femoral veins and the right uterine vein. A large embolus, apparently from the right leg, was lodged in the left pulmonary artery. The kidneys exhibited "lower nephron nephrosis" (fig. 2) and minimal hypertensive vascular changes. There was a moderate cardiomegaly. Close examination of the pancreas revealed no adenomatous islet cell hyperplasia. The mechanism for most of the clinical findings is apparent. The hypoglycemia, however, is not easily explained. In most cases of pheochromocytoma, there is hyperglycemia if there is any detectable change in glucose metabolism. In two instances there was a one- and

Figure 1. The left adrenal gland showing a large pheochromocytoma with extensive necrosis, contrasted with the normal right adrenal.

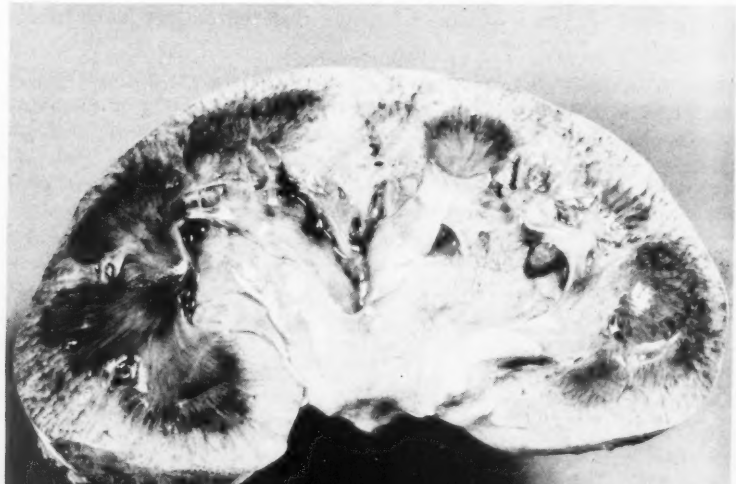

Figure 2. Section of kidney revealing typical gross changes of "lower nephron nephrosis."

four-hour lag between the onset of symptoms and the time the blood sugar was drawn. It is conceivable that the patient's glycogen store was low and that the episodes were initially associated with a hyperglycemia. By the time the blood was drawn, however, the excessive epinephrine stimulation had long since been removed and a rebound drop in blood sugar resulted. The low blood sugar may have been a cause for some of the symptoms which would therefore have responded to dextrose given intravenously. The mechanism of death in this case undoubtedly includes several factors. First, the pulmonary embolism; second, probably the exhausted state of the heart; and third, the possible over-all exhaustion of the body and decompensation of the alarm reaction.

Pathologic diagnoses:

1. Pheochromocytoma, left adrenal
2. Pulmonary embolism, left pulmonary artery
3. "Lower nephron nephrosis"

Doctor Horner: Was the tumor chemically analyzed?

Doctor Butz: Yes. We sent it to the medical laboratories of the Army Chemical Center. No pressor amines were demonstrated in the tumor; however, the tumor got to the Center 17 hours after it left this hospital. It was unfrozen and it was believed that the pressor substances may have undergone destruction.

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Authorship cannot be conferred; it may be undertaken by one who will shoulder the responsibility that goes with it. To a responsible writer, an article, with his name on it, is the highest product of his mind and art, his property, as nearly flawless as he can make it, founded in his character and evidence of it.

—RICHARD M. HEWITT, M. D.
in *Journal of American Medical Association,*
p. 477, Oct. 2, 1954

ARMY MEDICAL RESERVE OFFICERS TO SERVE ON ADVISORY COUNCIL TO SURGEON GENERAL

A council of five general officers from the Army Medical Corps Reserve to advise the Surgeon General on matters related to the medical reserve has been appointed by the Department of the Army. Major General George E. Armstrong, the Surgeon General of the Army, welcomed the officers invited to form the council at the initial meeting recently in his office. He declared their advice would be sought on special reserve items having far-reaching impact on the health professions of the nation as well as on those problems concerning the general activities of the Army's medical reserve.

Reserve officers of the Army Medical Corps, shown with Surgeon General George E. Armstrong, center, are (left to right) Brigadier Generals Alexander Marble and I. S. Ravdin, Colonel James B. Mason, and Brigadier Generals Perrin H. Long, Harold G. Scheie, and Frank E. Wilson.

The council members include: Perrin H. Long, M. D., College of Medicine, State University of New York; Alexander Marble, M. D., Joslin Clinic, Boston, Mass.; I. S. Ravdin, M. D., University of Pennsylvania School of Medicine, Philadelphia; Harold G. Scheie, M. D., University of Pennsylvania Graduate School, Philadelphia; and Frank E. Wilson, M. D., Director of the Washington Office of the American Medical Association.

Meetings of the council are scheduled to be held in the spring and fall of each year, the scope of such conferences to range from procurement of reserve personnel to the use of professional reserves.

Treatment of Nonunion of Mandibular Fracture

CHARLES C. ALLING, *Major, DC, USA*

IN THE course of bone repair, the most common local causes of nonunion of fractured fragments are (1) lack of apposition, (2) movement of the fragments, and (3) infection. This last-named cause is illustrated by the case presented herein, in which adequate closed reduction of a fractured mandible and a clinically well-controlled postoperative course failed to result in bony union. In addition, apparent roentgenographic evidence of two lines of fracture when only one existed constituted an interesting problem in roentgenographic interpretation.

CASE REPORT

In 1949 a 24-year-old soldier was admitted to this hospital four hours after he was involved in an automobile accident. He had not lost consciousness and was well oriented. Constabulary troopers covering the accident had observed the patient for shock, checked the vital signs, and administered 0.032 gram of morphine sulfate. On admission he complained of inability to "close the front teeth together," but had no acute pain or respiratory distress. His past history was noncontributory.

The patient had no abnormal habitus or facies except for a contusion in the area of the right mental foramen. Bimanual palpation and intraoral inspection disclosed a fracture between the right mandibular bicuspid teeth. The second bicuspid was luxated and very mobile. The right mandibular first molar had a large mesial carious lesion. Radiographically, the line of fracture extended toward the base of the body of the mandible in a posterior and inferior arc through the mental foramen. Because the lingual mandibular cortical plate was fractured anterior to the buccal cortical plate, two fracture lines were seen. Periapical abscesses were noted on both roots of the first molar (fig. 1).

The serologic test was negative, and other laboratory findings were within normal limits.

The second bicuspid was removed and a closed reduction of the fracture with interdental continuous loop wiring and inter-

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maxillary traction was effected within seven hours after the injury, with excellent anatomic results. The patient received 18 mg. (30,000 units) of penicillin intramuscularly every three hours for five days, and daily irrigations. The laceration of the soft tissue at the extraction site repaired itself in two weeks

Figure 1. Preoperative roentgenogram disclosing line of fracture in oblique mediolateral direction, luxated second bicuspid, and periapical abscesses on first molar.

without incident. Firm immobilization and accurate approximation were retained during the following six-week period (fig. 2). When the traction was removed, however, nonunion was evidenced by the extreme mobility of the bones at the fracture site. There was no clinical evidence of osteoid tissue formation or of a fibrous nonunion.

An open reduction with direct interosseous ligation of the fracture site was decided on in the belief that the first molar was providing an avenue of infection to the fracture line and causing a subclinical inflammation. Two days preoperatively the first molar was sectioned with burs and removed from the posterior fragment. The continuous loop wiring was allowed to remain on the anterior and left sides of the dental arches. An

incision six centimeters long was made one centimeter below and parallel to the base of the body of the mandible, and the fracture line exposed by sharp dissection. The fragments were freely movable. There was no evidence of a suppurative process.

Figure 2. Roentgenogram showing closed reduction that resulted in nonunion.

Early granulation tissue on the fractured surfaces was removed with curettes and bone files. Drill holes were punched through the heavy lower cortical margin of the mandible about one centimeter from the fracture line and equidistant from the base of the mandible. Immobilization was obtained by passing a 22-gage stainless steel wire through the holes and twisting the free ends. The soft tissues were closed in layers with catgut sutures, and the skin incision was closed with interrupted black silk sutures. An anatomic apposition was obtained (fig. 3).

Figure 3. Roentgenogram showing open reduction with interosseous wiring, resulting in bony union.

Intermaxillary traction was reapplied and clinical evidence of bony union was present after a six-week period. The skin incision repaired with minimal scarring and did not appear objectionable.

COMMENT

The three major causes of nonunion of fractures—lack of apposition, movement of the fragments, and infection—by no means comprise the entire list of factors causing this condition, as such a listing would include a multitude of constitutional causes and a more definitive enumeration of local factors.[1] Because this young soldier had no history or clinical evidence of a major constitutional or systemic disease, it was concluded that nonunion was secondary to a local factor. Fry and others[2] describe a number of avenues to a fracture site which infection

may follow to cause an eventual nonunion. Their reasoning leads me to suspect that the causative agent in this patient was the abscessed first molar, because the only material difference in the second phase of treatment was its extraction.

A fine point in the interpretation of radiographic film is raised by the apparent existence of two lines of fracture. Matthews[3] described this phenomenon: "It must be remembered that only the cortex makes very much registration on . . . film . . . . When the break is on the bias . . . we will have what appears to be two separate breaks." The routine use of radiographic examination from several angles would help preclude misinterpretations of the actual character of the fracture site. In this instance an occlusal radiographic projection proved that there was a single fracture line traversing obliquely through the mandible.

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WANTED: MORE SPECIALISTS, FEWER GPs

Recently there has been among our medical students a desire to go into general practice. This is the result of the advice they have received. . . . Nevertheless, there has never been a time when there is less need for general practitioners than today. With the growth of our country, the population has become more and more condensed. Sparsely settled areas are less frequent. With our roads and rapid transportation, medical centers with various specialties represented can supply a far higher level of care than can be given by an equal number of general practitioners. Most often the internist will be the family medical adviser, because of the greater frequency of ailments of short duration.

Our need in this country at the present time is for more specialists grouped in centers wherever the population is sufficient to support several doctors. This would make for a higher level of service. The need for general practitioners is diminishing, and the trend of our medical students toward general practice is unfortunate and shortsighted. I believe it will be short-lived.

—HOWARD C. NAFFZIGER, M. D.
in *Annals of Surgery,*
p. 265, Sept. 1954

Giant-Cell Tumor of the Sacrum

RALPH P. CAMPANALE, *Lieutenant Colonel, USAF (MC)*
WILLIAM J. REALS, *Captain, USAFR (MC)*

BENIGN giant-cell tumors constitute about 10 percent of all neoplasms of bone,[1] and occur most frequently in the long bones of young adults. The vertebral column is infrequently, and the sacrum only rarely mentioned in numerous reviews of this tumor.[1-4] In 1953, Hays[5] was able to collect from the literature only 24 cases of giant-cell tumor of the sacrum, and added one additional case report. The rare occurrence of this tumor in the sacrum is believed to justify reporting additional cases.

CASE REPORT

This 24-year-old airman was admitted on the surgical service of this hospital on 18 December 1952 because of severe pain, of four months' duration, in his lower back which radiated down his left leg.

Present Illness. The patient had experienced the pain suddenly after sliding into a base during a baseball game. Outpatient care from the day of injury to about one month prior to admission consisted of local heat, massage, and diathermy to the region of his lower back. A roentgenogram of the lower back had been made, but the patient had not been informed of the findings. During this three-month conservative treatment, the patient noticed the gradual onset of constipation, which became increasingly severe, and progressive difficulty in initiating his urinary stream, associated with the sensation of an inadequate emptying of his bladder at the completion of the act of voiding. He occasionally voided while sleeping. About six weeks prior to admission, he began to experience attacks of severe lancinating pain which radiated down the posterior aspect of his left thigh into his left leg, as far down as the ankle region. He became aware of inability to obtain an erection and of numbness of the skin in the region of his genitalia. One month prior to admission to this hospital, he had been hospitalized at his local medical facility, and subsequently had been transferred to another hospital where he was placed on a neuropsychiatric ward for psychiatric observation. He recalled that a rectal examination had been

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performed, but that no further investigative measures were accomplished. One week prior to admission to this hospital, while on convalescent leave, he experienced pain of such severe nature that his family insisted on complete examination by their family physician. On rectal examination the family physician noted a tumor mass, and had roentgenograms made of the lower back and sacrum. The patient was then referred to this hospital for further evaluation and treatment. He had lost about 35 pounds in weight during the four months of his illness. Complete systemic review was otherwise noncontributory.

Physical Examination. The patient was well developed and well nourished but appeared to be acutely ill. He walked with obvious distress, holding his left buttock with his left hand, with a moderate scoliosis to the left. He weighed 142 pounds; his temperature was 98.6° F.; pulse, 76 per minute; respirations, 20 per minute; and blood pressure, 118/70 mm. Hg. The heart, lungs, and abdomen were normal. Rectal examination revealed a moderately tender, firm, five- by eight-centimeter mass in the retrorectal region, between the rectum and the sacrum. Pressure on this mass caused an exacerbation of lancinating pain down the posterior aspect of his left thigh into his leg. Neurologic examination revealed saddle hypalgesia involving segments from S-2 to S-5 on the right. The knee jerks were accentuated slightly bilaterally, and the ankle jerks were markedly diminished bilaterally, the left more so than the right. The plantar reflex was extensor in character bilaterally, the left more so than the right. Muscle tone was increased in both legs.

Laboratory Findings. Red and white blood cell counts, hemoglobin, hematocrit, urinalysis, serologic tests for syphilis, sedimentation rate, blood urea nitrogen, fasting blood sugar, blood chloride, blood CO_2 combining power, acid and alkaline phosphatase, and complete liver profile studies were entirely within normal limits. Dynamic pressure of the spinal fluid was normal. The spinal fluid revealed: four lymphocytes per cc.; glucose, 76 mg. per 100 cc.; chlorides, 114.5 mEq./L; globulin, two plus; total protein, 90 mg. per 100 cc. The colloidal gold test showed a normal curve.

Roentgenographic study of the sacrum (fig. 1) revealed destruction of almost the entire sacrum below the level of S-1. The posterior cortical layer was preserved. The interpretation of the attending roentgenologist was that the lesion represented a tumor process originating in the sacrum which had broken through the anterior cortical aspect of this bone. Roentgenographic findings of the chest, skull, and long bones were normal.

Course in the Hospital. Proctoscopic examination was accomplished to the 12-cm. level; attempts to pass the instrument

further caused excruciating pain radiating down the left leg. A retrorectal mass encroaching upon the lumen of the rectum, but not involving the mucosa, extended to the 10-cm. level. It was the opinion of the proctologist that the tumor was extrinsic to the rectum proper. Intravenous pyelography revealed good excretion of the dye bilaterally, with an apparently normal upper

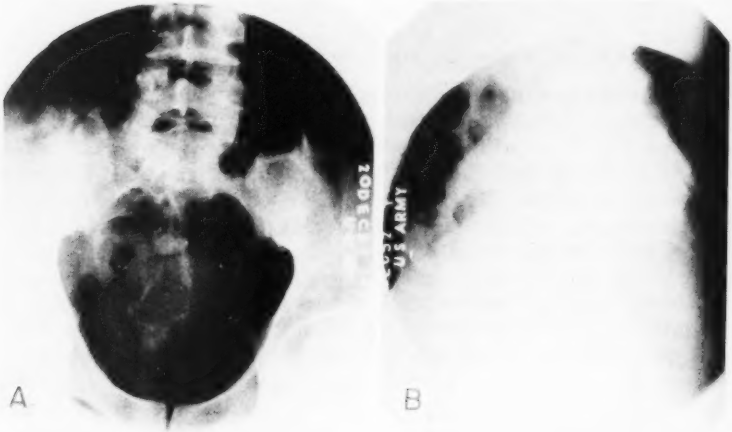

Figure 1. Preoperative roentgenograms of the sacrum. (A) *Anteroposterior view.* (B) *Lateral view.*

urinary tract. The ureters were of normal caliber without displacement. Cystoscopic examination under topical anesthesia revealed moderate trabeculation of the bladder with the capacity increased to 650 cc. indicating some atonicity of the musculature. The prostate was entirely normal. It was the opinion of the consulting urologist that the patient had a retrorectal tumor in the presacral area with an early cord bladder.

Preoperative Diagnosis. Following the examinations and studies described above, it was believed that the patient had a tumor originating in the sacrum which had produced an early cauda equina syndrome. It was further believed that this tumor was probably a giant-cell tumor of the sacrum, but that the condition could easily be produced by a chordoma, or a chondrosarcoma of the sacrum.

Operation. On 23 December 1952, under general endotracheal anesthesia, with the patient in the prone jackknife position, a vertical midline incision was made from the spinous process of L-5 to the superior anal verge. Lateral flaps of skin and subcutaneous fat were dissected free for several inches beyond the

lateral sacral borders. The anococcygeal ligament was incised and the levator ani muscles were severed bilaterally. The rectum was easily dissected free from the anterior surface of the tumor mass by blunt dissection to a point beyond the most superior extension of the tumor. The tumor appeared encapsulated and had not penetrated the fascia propria of the rectum. It extended from about the lower border of S-2 down to the coccyx, and involved the entire anterior surface of the lower sacral segments, extending from one lateral margin to the other. The gluteus maximus muscles were severed about three centimeters lateral to the sacral borders, and the sacrotuberous and sacrospinous ligaments were cut. The piriformis muscles were severed about two centimeters from the sacrum, care being taken to avoid injury to the sciatic nerve and gluteal vessels emerging through the superior and inferior piriform spaces. While cutting the piriformis muscles, it was obvious that the tumor had invaded these muscles bilaterally. Frozen section confirmed this belief, and further revealed that the tumor was a giant-cell type. Wider excision of the piriformis muscles beyond the areas of gross involvement was then performed. The sacrum was transected at the lower border of S-2, and it was found that the tumor process had extended to this level as well. A curet was used to scrape the tumor from within this segment, and the meningeal sac, representing the termination of the subarachnoid space, was found to be about one centimeter superior to the level of resection. After thorough curettage of S-2, electrocauterization of this segment was also performed. The wound was lavaged with several gallons of lukewarm saline solution, packed with plain gauze, and the superior and inferior wound margins were loosely approximated with silk sutures. The patient was then carefully turned to the supine position.

A three-inch transverse incision was made over the right rectus muscle about one inch superior to the umbilicus. Inspection of the liver and palpation of the periaortic areas failed to reveal any evidence of tumor or lymphadenopathy. A loop colostomy was performed in the manner described by Wangensteen.

Pathologic Examination. *Gross.* The specimen consisted of a large mass of mixed tissues measuring 15 cm. at its greatest diameter. It was made up of a thick flat mass of muscle and fibrous tissues to which was affixed thin fragments of cancellous bone forming a large open canopy filled with a hemorrhagic, soft, friable, spongy, tissue mass varying in color from purple to tan gray. Numerous additional fragments of muscle and nerve fibers, which were grossly involved by the friable tumor tissue, completed the specimen.

Microscopic examination. The tumor was composed of a stroma of round and spindle-shaped cells, variably arranged

loosely and densely. Interspersed throughout were numerous multinucleated giant cells (fig. 2). The stromal cells showed

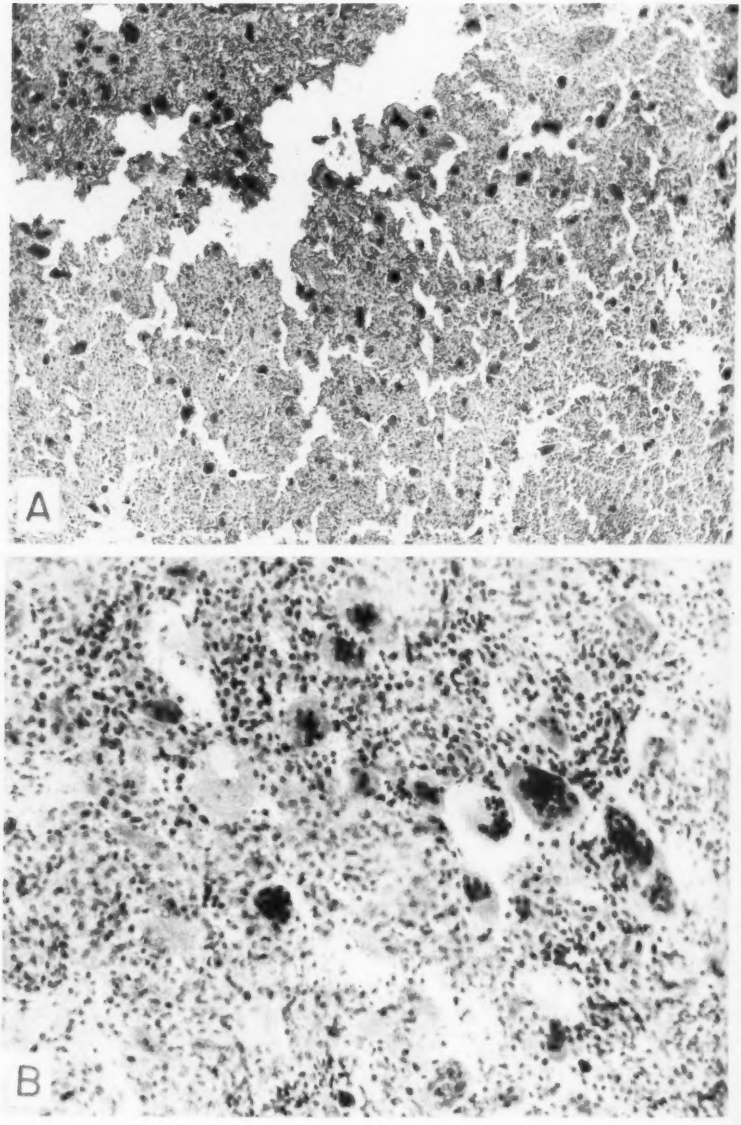

Figure 2. Photomicrographs of sections from the giant-cell tumor of the sacrum. A (× 48). B (× 160).

very rare mitotic activity and only occasional variation in nuclear staining. In some areas there was a moderate amount of collagen being produced by the spindle-shaped cells. The stroma in general was quite vascular and there were many areas of hemorrhage and necrosis. Sections through the muscle on the lateral margins of the specimen revealed gross tumor invasion. Diagnosis: Giant-cell tumor of the sacrum.

Figure 3. Postoperative anteroposterior roentgenogram of the lumbosacral region.

Postoperative Course. The patient was given penicillin and streptomycin parenterally, and was kept in bed for the first three days. He ran a low-grade fever, and complained of moderate generalized weakness. Several 500-cc. transfusions of whole blood were administered to maintain a satisfactory hemogram. The patient was ambulatory with assistance on the fourth postoperative day, and complained of moderately severe pain at the operative site, especially on ambulation. It was considered that instability of the lower end of the spinal column might contribute to his pain, and the patient was therefore placed on complete bed rest. Under intravenous morphine sedation, the packing was

removed from the wound on the fifth postoperative day, and several drains were inserted. The wound was irrigated four times a day with a penicillin-saline solution. The patient had a difficult postoperative course, and required large doses of narcotics frequently for relief of pain. About two weeks after the operation, his pain became intractable. He was seen by orthopedic and neurological consultants who were in agreement that his pain probably represented cord compression at from T-10 to T-12 level, probably from central metastases of the tumor. Roentgenographic examination of the sacrum during the immediate postoperative period did not reveal any evidence of residual tumor in bone (fig. 3).

On 10 January 1953 the patient was evacuated by air to a neurosurgical hospital, where emergency bilateral cervical cordotomy was performed. Immediately following this operation, his pain was completely relieved, and he developed complete quadriplegia. The posterior wound slowly filled in with granulation tissue, but failed to heal completely, leaving a draining sinus in the middle of the wound. Radiation therapy in the amount of 4,800 r u. (air dose) with an estimated tumor dose of 3,000 r u. was administered to the remaining sacrum and parasacral regions. A slow recovery from the quadriplegia was made during subsequent months, and the patient gained weight and felt stronger. Regression of the quadriplegia progressed to the point that the patient was left with a mild drop foot on the right and some weakness in both upper extremities.

On 21 May 1953 the patient was transferred to a Veterans Administration hospital near his home. Neurologic examination at that hospital revealed partial loss of pain and heat below the level of T-4, and complete loss of pain and heat below the level of S-1. The patient complained of persistent diarrhea from his colostomy, and of mild fever which was believed to be secondary to urinary infection associated with the prolonged presence of the indwelling bladder catheter. The bladder catheter was replaced by a condom type catheter, and sulfisoxazole (gantrisin) was administered for several days with excellent results. Roentgenographic examination of the residual sacrum did not reveal any evidence of tumor destruction. The patient was presented before a tumor board at that hospital whose recommendation was that no further therapy was indicated. He was discharged on 7 July with a Davol type of colostomy bag.

Follow-Up. The patient had additional hospitalizations at the same Veterans Administration hospital from 10 August 1953 to 14 September 1953, and 23 November 1953 to 4 December 1953. These hospitalizations were occasioned by minor complaints referable to irritation from the colostomy or to bladder infection

secondary to the presence of the indwelling catheter. During his last hospitalization, complete examination of the patient revealed that he was in good general condition with the same neurologic findings that were present during his first Veterans Administration hospital admission. All four extremities had recovered completely from the quadriplegia, and there was no evidence of atrophy or fasciculation. The patient's psychologic adjustment to his disease was excellent, and he related that he had made arrangements with another patient in the same hospital to form a partnership in a small business endeavor. Roentgenographic examination of the sacral region, chest, and complete long bone survey about one year after his operation failed to reveal any evidence of persistence or spread of his basic disease. A follow-up examination in the outpatient department of the same Veterans Administration hospital on 4 March 1954 revealed that the patient had no complaints and did not show any evidence of progression of sensory or motor disturbances.

DISCUSSION

The history of our patient revealed that he was hospitalized at a neuropsychiatric center for observation. Hays relates that his patient was tagged as a hypochondriac, and sent to a psychiatric hospital for treatment. Primary tumors in the region of the sacrum are extremely rare and may pass unrecognized until the late occurrence of objective signs of organic disease force the physician to re-evaluate the subjective complaints of the patient. In a review of the literature in 1948, Ross[6] collected 54 sacral and presacral tumors, only four of which were giant-cell tumors.

True giant-cell bone tumor is not as benign as was once believed, and recurrence after therapy is not uncommon. Malignant transformation has been described, both in the untreated case and after inadequate treatment.

The treatment of giant-cell tumor in general is the subject of considerable controversy. In other parts of the body, both surgical excision and irradiation have been successfully used, either alone or in combination. Haggart and Hare[7] advocate surgical excision of easily accessible giant-cell tumors which can be removed without sacrifice of function and combined preoperative roentgen-ray therapy followed by curettage for large tumors which present more serious problems. Compere[8] believes that the degree of success of roentgen irradiation therapy for giant-cell tumor is largely determined by the size of the tumor, and that large tumors cannot be completely destroyed without great injury to surrounding soft parts. Stewart and Richardson[9] and Hatcher[10] have described the occurrence of sarcoma in a benign lesion subsequent to irradiation, and therefore believe that surgical treatment is preferable if important functions will not be lost.

Surgical removal was the treatment of choice in our patient because the lesion was extensive with an existing cauda equina syndrome. Postoperative irradiation therapy was carried out because of muscle invasion, and extension of the tumor along nerves and fascial planes.

The patient has had a very gratifying result with a complete relief of pain and no evidence of tumor recurrence 15 months after initial treatment.

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A NEW COUGH SUPPRESSANT

Dextro-3-methoxy-N-methylmorphinan hydrobromide (Ro 1-5470/5), a new antitussive agent, was administered to 183 patients, of whom 39 are not included in the appraisal of its merits as a cough suppressant. Twenty-seven of these latter subjects had no cough and were given the drug solely for the purpose of determining its toxicity on prolonged administration. Of the 144 instances in which the antitussive effectiveness of Ro 1-5470/5 was studied, 107 had pulmonary tuberculosis, 22 bronchitis, eight bronchiectasis, four bronchial asthma, two lung abscess, and one bronchogenic carcinoma. Results were as follows: 23 patients (15.9 percent) had no to slight relief of cough; 67 (46.5 percent) derived moderate; and 54 (37.5 percent) marked to complete relief of cough. Single doses of 15 mg. q. i. d. were productive of better results than 4-mg. doses.

—NATHAN RALPH, M. D.

in *American Journal of the Medical Sciences,* p. 302, Mar. 1954

Benign Chondroblastoma (Codman's Tumor)

Case Report and Review of Literature

JOSEPH M. OPPENHEIM, *Captain, MC, USA*
ROBERT W. BOAL, *Colonel, MC, USA*

BENIGN chondroblastoma is one of the less common lesions of bone, but because of a certain amount of confusion and disagreement in its nomenclature and its occasional unduly radical treatment as a malignant tumor, it is deserving of consideration. In 1931, Codman[1] described nine cases of epiphyseal chondromatous, giant-cell tumor of the upper end of the humerus, which has since been called Codman's tumor, or which pathologists currently call benign chondroblastoma.

In 1942, Jaffe and Lichtenstein[2] reported nine cases of this condition, terming it chondroblastoma of bone. They emphasized differentiation of this lesion from giant-cell variants, chondrosarcoma, and osteogenic sarcoma, and noted its occurrence in additional sites. They described benign chondroblastoma of bone as starting in an epiphysis of a long bone, with possible extension to the articular surface of the epiphysis and even into the metaphysis as it developed, but rarely attaining a size of more than from 3 to 5 centimeters in diameter. They found the lesion in the distal end of the femur, the proximal end of the tibia, and the upper end of the humerus. In their series, the tumor occurred more frequently in adolescent or postadolescent males.

The basic tumor cell of the lesion was described as a polyhedral or round cell of moderate size, with a fairly large nucleus. The tumor cells might be closely packed or more loosely agglomerated, with the presence of focal areas of calcification of the cellular tumor tissue. Wherever the calcification becomes intense, the tumor cells swell and undergo necrosis. The necrotic tumor tissue comes to be replaced by hyaline chondroid tissue which subsequently may show spots of ossification. There may be areas of hemorrhage and one may see large vascular sinuses bordered by viable tumor tissue, necrotic tumor tissue, or hyaline chondroid material which has replaced the necrotic tumor tissue. Clumps of large multinuclear giant cells may be

From U. S. Army Hospital, Fort Knox, Ky.

seen in the areas of hemorrhage, about the vascular sinuses, and even in the hyaline chondroid tissues.[2] In their experience the lesion was entirely benign and healed without recurrence after thorough curettage, without supplementary radiation.

In 1947, Coley and Santoro[3] reported eight cases occurring between the ages of 12 and 20, divided equally between the sexes. They recorded excellent results with surgical removal, curettage, and packing of the resulting cavity with bone chips. Their conclusions agreed generally with those of Jaffe and Lichtenstein.

In 1949, Lichtenstein and Kaplan[4] reported a case of benign chondroblastoma of bone in the femoral capital epiphysis, and mentioned six additional cases since the report of 1942. They again called attention to the frequency with which this lesion is confused with giant-cell tumor, malignant chondrosarcoma, and osteogenic sarcoma, with the attendant needless amputation of the affected limb. He found the sites of predilection to be the femur, tibia, and humerus, in that order.

In 1948, Copeland and Geschickter,[5] in a presentation of 25 cases, discussed the chondroblastoma and described a malignant variety. Ten lesions in their series were benign and 15 malignant. They believed that the tumor begins on the metaphyseal side of the epiphyseal line and migrates across it. The malignant type of chondroblastoma was described as having large nuclei of the chondroblastic type, being bizarre in shape and variable in staining reaction. Mitotic figures are frequently found. The calcification is not confined to the matrix, but is seen to overlap the cellular elements unless the section is cut to extreme thinness. Margins of the tumor may show solid islands of chondroblasts arranged in somewhat alveolar fashion, infiltrating fibrous tissue. Much of the tumor is composed of such alveolar masses with little or no hyaline matrix.

They recommended operation with complete curettage of the lesion, followed by roentgen-ray therapy. If the pathologic report revealed malignancy, amputation was performed. The patients with malignant lesions usually died in from nine to 18 months.

CASE REPORT

A 22-year-old soldier was first seen on 6 July 1953 at an Army hospital in Germany, where roentgenograms revealed a bone tumor of the medial condyle of the left tibia (fig. 1). The patient gave the history of having injured his knee the previous May, while jumping from a truck and striking his knee on the tailgate. He was transferred to this hospital. On admission, he complained of moderate pain and swelling on the medial aspect of his left

knee, which was aggravated by prolonged activity. The pain was slowly becoming worse, but was not severe enough to require analgesics. He gave no history of inflammation about the area.

On 30 September 1953, the bone cortex over the lesion was unroofed, and the defect thoroughly curetted and packed with

Figure 1. Roentgenogram showing a benign chondroblastoma (Codman's tumor) of the medial condyle of the left tibia.

cancellous bone chips from the right ilium. The postoperative course was uneventful and the patient received an intensive regimen of physiotherapy. When last seen in March 1954 he had a full range of motion of the left knee and excellent use of the entire left lower extremity, and was performing military duty.

At operation the lesion was essentially cystic, but in the lower pole there was a small mass of yellow, gritty tissue. The patho-

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logic diagnosis was "benign chondroblastoma of bone." This was confirmed by the report from the Armed Forces Institute of Pathology, which added the additional note as follows: "The staff is in agreement with your designation of the lesion as benign chondroblastoma, or better yet as a Codman tumor. The staff prefers that eponym because chondroblastoma has been used by Geschickter and Copeland in an entirely different meaning: *viz.*, that of a quite malignant type of chondrosarcoma which is in sharp distinction to the meaning that Jaffe and Lichtenstein intended when they first coined the term. Therefore, to avoid misunderstanding, the staff still uses the term 'Codman tumor' for these tumors. All of the main features are present which Codman described: *viz.*, the lesion is an epiphyseal lesion, it is a giant-cell tumor, and it produces cartilage; hence, his term 'epiphyseal chondromatous giant-cell tumor.' In addition, this particular tumor appears to be, in part, cystic in character. There are several portions of the wall of a cyst, and in many places the wall is lined by indifferent stromal cells and giant cells such as may be seen in an ordinary giant-cell tumor. The staff has previously had a cystic lesion of an epiphysis which was thought to be the result of cystic degeneration of a Codman tumor, but it could not be clearly established. In this particular case, the question of the nature of the tumor as a Codman tumor is beyond doubt, and therefore the fact that cystic degeneration of Codman tumors can develop is established and a very important point is made by this case."

SUMMARY

A benign chondroblastoma (Codman's tumor) of the proximal tibia, though characteristic, also showed cystic changes. After thorough curettage of the lesion and packing with cancellous bone chips from the right ileum, the patient regained full use of the extremity.

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PROMOTIONS OF OFFICERS

The following officers of the military medical services on active duty in the Army, Navy, and Air Force have recently received temporary promotions to the rank indicated:

Medical Corps

Jesse F. Adams, *Comdr., USN*
Walter C. Autrey, Jr., *Capt., USAF*
Kenneth P. Bachman, *Comdr., USN*
Leonard H. Barber, *Capt., USN*
Otto C. Baumgarten, *Capt., USN*
Lynn S. Beals, Jr., *Capt., USN*
Ferdinand V. Berley, *Capt., USN*
Arthur K. Brelia, *Capt., USAF*
Richard R. Cameron, *Col., USA*
William U. Cawthon, *Capt., USAF*
Joseph S. Cirlot, *Col., USA*
Henry R. Cooper, *Comdr., USN*
Martin Cooperman, *Capt., USN*
Marvin D. Courtney, *Comdr., USN*
James Crawford, *Capt., USN*
Philip D. Cronemiller, *Comdr., USN*
Paul Deranian, *Capt., USN*
Edward J. Doyle, *Col., USA*
Desale G. Duvigneaud, *Capt., USN*
Edward Gartman, *Lt. Col., USA*
James U. Guthrie, *Capt., USAF*
Alfred O. Heldobler, *Lt. Col., USA*
Howard W. Hill, *Comdr., USN*
James B. Hutchinson, *Lt. Col., USA*
Edward P. Irons, *Capt., USN*
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Vernon E. Martens, *Capt., USN*
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John E. Nardini, *Capt., USN*
Hugh V. O'Connell, *Capt., USN*
Augusto Ortiz, *Capt., USAF*
Edwin L. Overholt, *Lt. Col., USA*
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Bruce H. Smith, Jr., *Comdr., USN*
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Harry T. Stradford, *Capt., USN*
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Robert H. Wise, *Capt., USAF*

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John C. Brown, *Capt., USAF*
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Richard C. Shaw, *Capt., USN*
Robert D. Solomon, *Comdr., USN*
Jerome C. Stoopack, *Comdr., USN*
Simon W. Susewind, *Comdr., USN*
Henry E. Syzek, *Capt., USA*
Wilbur A. Trick, *Comdr., USN*
Robert M. Williams, *Comdr., USN*
Robert D. Wyckoff, *Capt., USN*

Veterinary Corps

Thomas A. S. Hays, *Lt. Col., USA*
James K. MacNamee, *Lt. Col., USA*

Listings in this department will be limited to promotions published in orders and dispatches dated subsequent to 1 Oct. 1954.—*Editor*

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Gordon H. Rhoades, *Maj., USAF (MC)*

*Oak Leaf Cluster.

The names of officers of the medical services who have been awarded decorations by the United States Army, Navy, or Air Force are published in this department each month following receipt of information from official sources.—*Editor*

MILITARY DUTY OF 300 INTERNS DEFERRED; CHOSEN BY LOT FOR RESIDENCY TRAINING

A total of 300 interns have been selected by the Department of Defense for deferment for one-year residencies in 15 medical specialties essential to the military departments. The names were drawn by lot recently from among more than 1,300 nonveteran interns who asked for further deferment under the new Armed Forces Reserve Officer Commissioning and Residency Consideration Program announced last September.

Dr. Walter B. Martin, right, and Colonel William W. Roe, Jr., MC, USA

Dr. Walter B. Martin, president of the American Medical Association, made the initial drawings during ceremonies in the office of Dr. Frank B. Berry, Assistant Secretary of Defense (Health and Medical). The first name drawn was that of Dr. William F. Reus, Jr., University of Michigan Hospital at Ann Arbor, who plans a residency in surgery and expects to take a reserve commission in the Air Force.

REGULAR DENTAL CORPS OFFICERS CERTIFIED BY SPECIALTY BOARDS

The American Board of Oral Surgery

Organized in 1946, the American Board of Oral Surgery is second in size of the seven specialty boards approved by the American Dental Association. The more than 300 dentists certified in this specialty include 21 regular Dental Corps officers of the military services:

Charles C. Alling, *Maj., USA*

Raymond E. Boudreaux, *Lt. Col., USA*
Richard J. Burch, *Col., USAF*

Jack B. Caldwell, *Col., USA*
Charles J. Cashman, *Col., USA*
James E. Chipps, *Lt. Col., USA*
Walter V. Crowe, *Capt., USN*

H. Beecher Dierdorff, *Col., USA*

Roger G. Gerry, *Comdr., USN*
Harold G. Green, *Comdr., USN*

Raymond F. Huebsch, *Comdr., USN*

William B. Irby, *Lt. Col., USA*

Theodore A. Lesney, *Comdr., USN*
Joseph F. Link, *Comdr., USN*

Lowell E. McKelvey, *Col., USA*
Merritt M. Maxwell, *Capt., USN*
Alex M. Mohnac, *Lt. Col., USAF*

Robert B. Shira, *Col., USA*
William B. Simms, *Lt. Col., USA*

Ralph W. Taylor, *Rear Adm., USN*
Arthur S. Turville, *Comdr., USN*

Wilbur N. VanZile, *Capt., USN*

This is the second of a series. The names of officers certified by the American Board of Prosthodontics will be published in the March issue.

DEATHS

McLEAN, Marvin McDugald, Commander (MC) USN, U. S. Naval Hospital, Bethesda, Md.; graduated in 1927 from Johns Hopkins University School of Medicine, Baltimore, Md.; appointed Lieutenant Commander (MC) USNR, 21 August 1940; commissioned Commander (MC) USN 2 May 1947; died 31 December 1954, age 54, in Bethesda of metastatic carcinoma.

WILLIAMS, Sydney Lawrence, Commander (MC) USNR, U. S. Naval Ammunition Depot, Crane, Ind.; graduated in 1927 from New York University College of Medicine, New York; appointed Lieutenant (MC) USNR 7 April 1941; died 20 December 1954, age 52, in Crane of acute coronary thrombosis.

CORRESPONDENCE

To the Editor:—I am writing this letter to acquaint prospective and newly discharged medical officers from the Armed Forces with the great need for trained physicians in the field of physical medicine and rehabilitation. The demand for trained medical personnel in this field continues at an ever-increasing pace as a result of the development and extension of facilities and programs.

There are excellent trainee fellowships available through the United States Public Health Service and the National Foundation for Infantile Paralysis for qualified physicians with an interest in this field. The need is great and there are unprecedented opportunities, not only in teaching institutions but in hospitals and in group practice. There presently exists a rare opportunity for the young physician who is interested in comprehensive care of patients to fulfill an important role in an ever-expanding field.

HOWARD A. RUSK, M. D., Director
Institute of Physical Medicine and Rehabilitation
New York University-Bellevue Medical Center

To the Editor:—The Association of Military Surgeons of the United States at its sixty-first annual convention, held in Washington, D. C., on 29 November to 1 December 1954, awarded a Certificate of Merit to the Armed Forces Medical Publication Agency for the excellence of its scientific exhibit.

The certificate is enclosed and is herewith forwarded with pleasure and congratulations.

ROBERT V. SCHULTZ, Captain (MC) USN
Chairman, Scientific Exhibits
Association of Military Surgeons

The dignity of medicine is what sets it apart from other professions, what creates confidence of patients in physicians and permits them to entrust their lives to our hands.

—JUSTUS OHAGE, M. D.
in *Minnesota Medicine*,
p. 697, Oct. 1954

GEN. BENSON HEADS AERO MEDICAL ASSN. MEETING IN WASHINGTON, 21-23 MARCH

Specialists in aviation medicine from the Army, Navy, and Air Force will participate in the scientific program of the twenty-sixth annual meeting of the Aero Medical Association at the Statler Hotel in Washington, D. C., 21-23 March 1955, under the presidency of Brigadier General Otis O. Benson, Jr., USAF (MC).

The first Louis H. Bauer Lecture, established in 1954 in honor of the founder and first president of the Association, will be given by John F. Fulton, M. D., distinguished physiologist, biographer, and medical historian of Yale University, General Benson has announced. Dr. Fulton's presentation on 21 March is entitled "Louis H. Bauer and the Rise of Aviation Medicine." The Honorable Stuart Symington, United States Senator from Missouri, will give the principal address at the annual dinner on 23 March.

John F. Fulton, M. D., of Yale University will give the first Louis H. Bauer Lecture.

Brig. General Otis O. Benson, Jr., USAF (MC), President of the Aero Medical Association

Among the special features of the scientific program, arranged by a committee under the chairmanship of Captain Clifford P. Phoebus (MC) USN, are a symposium on space medicine to be conducted by Colonel A. P. Gagge, USAF (MSC), and a panel on flight at extreme speeds and altitudes by a group of the world's leading civilian and military test pilots. Military aeromedical scientists on the program include:

21 March

The Changing Complex of Aviation Medicine—Air Commodore T. C. MacDonald, Royal Air Force, Director of Hygiene and Research, Air Ministry, London

The Medical Aspects of Army Aviation—Col. William S. Moore, MC, USA; Lt. Col. Spurgeon H. Neel, Jr., MC, USA; and Maj. Leonard A. Crosby, Jr., MC, USA, Office of the Surgeon General, Department of the Army, Washington, D. C.

The Human Factors in Long-Range Flight—Charles A. Dempsey, B. S.; Capt. N. R. Burch, USAF (MC); 1st Lt. D. Chiles, USAF (MSC); 1st Lt. D. E. Warren, USAF (MSC); and Lt. N. E. Schmitt, USAF (MSC), U. S. Air Force Aero Medical Laboratory, Wright-Patterson Air Force Base, Ohio.

Physiological and Radiobiological Aspects of the 1954 Aeromedical Field Laboratory Balloon Flights—Maj. David G. Simons, USAF, and 1st Lt. C. H. Steinmetz, USAF, U. S. Air Force Aeromedical Field Laboratory, Holloman Air Force Base, N. Mex.

The Biological Significance of the Natural Background of Ionizing Radiation at Sea Level and at Extreme Altitude—Hermann J. Schaefer, Ph. D., U. S. Naval School of Aviation Medicine, Pensacola, Fla.

The Experimental Sealed Cabin of the U. S. Air Force School of Aviation Medicine—H. Strughold, M. D., Chief, Department of Space Medicine, U. S. Air Force School of Aviation Medicine, Randolph Air Force Base, Tex.

22 March

The Design and Evaluation of Aviation Protective Helmets—Comdr. Edward M. Wurzel (MC) USN, U. S. Navy Aero Medical Equipment Laboratory, Philadelphia, Pa.

Escape From Vertical Take-Off Type Aircraft—Comdr. Roland A. Bosee (MSC) USN, and W. C. Buhler, B. S., U. S. Naval Parachute Unit, El Centro, Calif.

Escape by Downward Ejection at High Speed and High Altitude—1st Lt. Ira M. Barash, USAF (MSC); Capt. Edward G. Sperry, USAF; and 1st Lt. Henry P. Nielsen, USAF, U. S. Air Force Aero Medical Laboratory, Wright-Patterson Air Force Base, Ohio.

Effects of Mechanical Force on Living Tissues. I. Exposure to Abrupt Deceleration. II. Exposure to Abrupt Windblast—Lt. Col. John P. Stapp, USAF (MC), Chief, Aeromedical Field Laboratory, Holloman Air Force Base, N. Mex.

Aircraft Accidents With Happy Landings—Capt. Richard B. Phillips (MC) USN, U. S. Naval Air Station, Glenview, Ill.

Further Evaluation of "Fear of Flying Syndrome"—Col. Lucio E. Gatto, USAF (MC), Sampson Air Force Base, N. Y.

The Problem of High-Intensity Noise at a Jet Air Base and Some Suggested Solutions—Comdr. Kenneth S. Scott (MC) USN, U. S. Naval Air Test Center, Patuxent River, Md.

Brightness Contrast and Target Identification Thresholds on the Radar PPI—Siegfried J. Gerathewohl, Ph. D., U. S. Air Force School of Aviation Medicine, Randolph Air Force Base, Tex.

Cabin Air Contamination Problems in Jet Aircraft—George Kitzes, Ph. D., U. S. Air Force Aero Medical Laboratory, Wright-Patterson Air Force Base, Ohio

23 March

Fatal Decompression Sickness in Flight—Webb Haymaker, M. D., and Lt. Col. Vincent M. Downey, USAF (MC), U. S. Air Force School of Aviation Medicine, Randolph Air Force Base, Tex.

Factors Affecting the Endurance of Psychomotor Skill—Maj. Robert B. Payne, USAF (MSC), and George T. Hauty, Ph. D., U. S. Air Force School of Aviation Medicine, Randolph Air Force Base, Tex.

An Analysis of Methods of G-Protection—Lt. David H. Lewis (MC) USNR, Aviation Medical Acceleration Laboratory, U. S. Naval Air Development Center, Johnsville, Pa.

Aviator's Oxygen Breathing Devices: Transition to Variable Integrated Systems—Aaron Bloom, B. S., Aeronautical Medical Equipment Laboratory, U. S. Naval Air Experimental Station, Philadelphia, Pa.

Oxygen Want Warning Systems for Military Aircraft—Edward L. Michel, M. S., Aeronautical Medical Equipment Laboratory, U. S. Naval Air Experimental Station, Philadelphia, Pa.

Current Developments in Improving Informational Presentations for the Navy Pilot—Fred R. Brown, M. S., Aeronautical Medical Equipment Laboratory, U. S. Naval Air Experimental Station, Philadelphia, Pa.

Simplifying the Pilot's Task Through Display Quickening—Franklin V. Taylor, Ph. D., and Henry P. Birmingham, A. B., U. S. Naval Research Laboratory, Washington, D. C.

A New Look for Aircraft Instrumentation—Lt. Comdr. George W. Hoover, USN, Office of Naval Research, Washington, D. C.

THE PROBLEM OF EPILEPSY

In the entire field of neurology there is no disease of greater importance than epilepsy. This is very quickly realized when one considers that epilepsy is a chronic disease and, therefore, that the patients are sufferers over a long period of time. Secondly, this is statistically a more important disease, since one out of every 200 of the total population has seizures. This, of course, in view of the number of patients, is a far greater problem than the neurologist can handle and, moreover, these patients need not and should not be the concern only of the neurologists. The physicians in general practice must be equipped to handle the great majority of these patients. It is only the unusual patient who is refractory to therapy or who presents a diagnostic problem that comes within the immediate realm of the neurologist.

—FRANCIS M. FORSTER, M. D.
in *Medical Annals of the District of Columbia*,
p. 137, Mar. 1954.

AIR FORCE FLIGHT SURGEON ATTAINS SPEED OF 632 M. P. H. IN DECELERATION TESTS

Lieutenant Colonel John P. Stapp, USAF (MC), Chief of the Aeromedical Field Laboratory, Holloman Air Force Base, N. Mex., on 10 December reached a speed of 632 miles per hour while riding a rocket-propelled sled to reproduce exposure to windblast and slowdown effects experienced by air crewmen when escaping from aircraft at supersonic speeds. In previous experiments he had attained a speed of 421 miles per hour in the "abrupt deceleration vehicle," the technical designation of the sled.

Lieutenant Colonel John P. Stapp, USAF (MC) and model of the abrupt deceleration vehicle used in recent experiments at New Mexico air base.

Exerting a total force of 40,000 pounds thrust, the nine rockets propelled the sled to its top speed in five seconds. After the rockets burned out, it coasted for less than half a second before the brakes were applied and it was abruptly halted. During the test, Colonel Stapp withstood a deceleration force of 35 g and a wind pressure of more than two tons. With the exception of a plastic helmet and visor, he wore no special clothing during the test.

A MESSAGE FROM THE A. M. A.

It is anticipated that a number of legislative proposals concerning medical care for dependents of members of the armed services will be introduced in the opening session of the 84th Congress. For a number of years the American Medical Association has been interested in this matter. There has also been a growing awareness in the medical profession and in government circles of the need for careful correlation of military and civilian medicine.

The American Medical Association and the medical profession generally desire that the highest quality of medical care be provided and maintained for the entire population, including military personnel and their dependents. It should be clearly understood that the Association is not opposed to the provision of medical care by the Federal government to the dependents of service personnel, if Congress, in its discretion, decides that such care is a proper emolument of military service. The Association, however, is concerned with the manner in which the medical care is to be provided.

The first legislative action taken in the United States in this regard was the Act of July 5, 1884 (23 Stat. 112). It authorized medical officers of the Army and contract surgeons, wherever practicable, to attend the families of officers and enlisted men free of charge. On 10 May 1943, the Congress passed an Act (Public Law 51, 78th Congress; 57 Stat. 80) providing medical and hospital care for dependents of personnel of the Navy and Marine Corps suffering from "acute medical and surgical conditions, exclusive of nervous, mental, or contagious diseases, or those requiring domiciliary care." This law also provided that dependents of Coast Guard personnel should be furnished hospitalization during periods when the Coast Guard was operating as a part of the Navy.

There is no specific Act of Congress pertaining to medical care for dependents of personnel of the Air Force, but the Act of 1884 has been considered applicable.

Medical and hospital services were provided for dependents of commissioned officers of the United States Public Health Service

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense.—*Editor.*

by a regulation of that Agency, published in 1931. Similar services were provided dependents of Coast Guard personnel by an Act of Congress in 1937 and for those of the Coast and Geodetic Survey in 1939. The dependents of these services are now entitled under Section 326 (b) of the Public Health Service Act of July 1, 1944 (Public Law 410, 78th Congress; 78 Stat. 697) to outpatient care at Public Health Service facilities, without charge, and to hospitalization (if accommodations are available) at Public Health Service hospitals only, at a per diem charge prescribed by the President.

In June of 1954, the Board of Trustees and the House of Delegates reviewed the policy on dependent medical care. At that time the Board recommended to the House of Delegates that "medical care should be made available for dependents of service personnel in the following manner: (1) By military physicians in military facilities in overseas areas other than United States territories or possessions, and in remote areas in the United States where civilian facilities are unavailable. (2) By civilian physicians in civilian facilities in all other situations." This position was approved by the House of Delegates on 23 June 1954.

At its most recent session at Miami in December 1954, the House of Delegates of the American Medical Association again enunciated the position of the medical profession on this subject, by stating "if it is to be the policy of the government to provide medical care for dependents of service personnel, the services of civilian physicians and hospitals should be used wherever possible, to be paid for at prevailing rates, with provision for free choice of physicians."

During the second session of the 83d Congress, Senator Leverett Saltonstall of Massachusetts, by request, introduced a bill to provide medical care for dependents of members of the Armed Forces of the United States (S. 3363). On 11 May 1954, at the request of Dr. Walter B. Martin, President of the American Medical Association, the Secretary and General Manager of the Association, Dr. George F. Lull, sent a letter to Senator Saltonstall, Chairman of the Senate Committee on Armed Services, outlining the actions and position of the American Medical Association, with respect to medical care for dependents of members of the armed services. Dr. Lull stated in his letter that in the event formal hearings were conducted on the proposal, the Association reserved the right to present further views and material. No hearings were held on the bill prior to the adjournment of Congress, and that bill died with the closing of the 83d session.

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Reviews of Recent Books

ATLAS OF MEN, by *William H. Sheldon,* Ph. D., M. D., with the collaboration of *C. Wesley Dupertuis,* Ph. D., and *Eugene McDermott,* M. A. 357 pages; illustrated. Harper & Bros., Publishers, New York, N. Y., 1954. Price $10.

This latest volume of the author's "Human Constitution" series presents in a richly illustrated compendium the results of the application of somatotyping technics and classifications to a sample of 46,000 men. The book contains almost 1,200 photographs, extensively indexed and placed in calibrated continuum, of persons representing different somatotypes. The photographs literally give flesh to the author's famous tridigit code. The presentation afforded by the photographs is augmented by tables showing the height, age, and weight distributions of the somatotypes illustrated. Because the book is an atlas, the textual material is comparatively limited, but the general aims of somatotyping and some of its technics are dealt with briefly.

The author states that the principal purpose of the *Atlas* is not to discuss questions concerning the theoretic soundness of somatotyping, but rather to provide a file of somatotype variations. Certainly he achieves this purpose. But he does allow himself the luxury of insinuating that, as he has so long maintained, personality reflects the somatotype; the discussion of each major grouping of his subjects is introduced by a thumbnail description of their body build and general behavior patterns, and analogies between each type and an appropriate animal. He does not further engage in the controversy over the relationship between body build and personality, but does provide objective measurements, reproducible from investigator to investigator, which can serve as elements of communication between those who have alined themselves for and against the idea that personality and body build are related.

The work will be useful to all those requiring information about the American male population as to the distribution of each combination of physical measurements. Clothing manufacturers, quartermasters in the armed services, tank and aircraft cockpit designers, and similar persons need this information. Dr. Sheldon suggests further that medical clinicians incorporate somatotyping into their routine description of patients. He expects such incorporation and correlation to reveal a relationship between certain of the "constitutional" diseases and body type. Thus, disease could be predicted in still-healthy individuals and appropriate steps taken.

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In any case, Dr. Sheldon has brought the estimation of body build from Kraeplinian subjectivity to a high order of objectivity. Individuals investigating psychiatric and organic illness and those studying variations in normal psychology and physiology will find in this work a tool to broaden the scope of their investigations, and perhaps one day to combine and integrate their several efforts.

—*WILLIAM F. SHEELEY, Lt. Col., USAF (MC)*

STUDIES IN SCHIZOPHRENIA, A Multidisciplinary Approach to Mind-Brain Relationships, by the *Tulane Department of Psychiatry and Neurology.* Reported by *Robert G. Heath,* Chairman. 619 pages; illustrated. Published for The Commonwealth Fund by the Harvard University Press, Cambridge, Mass., 1954. Price $8.50.

This unique volume details a co-ordinated study of the problem of schizophrenia by a team of psychiatrists, neurologists, physiologists, biochemists, clinical psychologists, and neurosurgeons.

In section I, hypotheses are advanced which conceive of the brain as having facilitory and inhibitory circuits that provide dynamic interaction between higher and lower levels of integration corresponding to various levels of the neuraxis. Schizophrenic patients are considered to have physiologic impairment in the facilitory circuit, which is said to be located in the septal region of the brain. This faulty facilitory circuit, presumed to exist since early childhood in schizophrenic persons, interferes with emotional and intellectual growth and results in their marked vulnerability to the stresses of everyday life.

Animal studies to support the above formulations are reported in section II. Lesions of the septal region in cats produced affectless and hypokinetic animals with metabolic changes that resembled those seen after extirpation of the adrenal cortex. Electrical stimulation of the midline septal region in cats and monkeys elicited alerting or facilitory functions in contrast to inhibitory responses that followed stimulation of the more lateral caudate area.

Human studies are reported in section III. Twenty patients with schizophrenia were used; three other patients with terminal cancer and tuberculosis served as controls. Electrodes were implated in various portions of the brain, mainly by the open method, a few by a closed stereotactic technic. Subcortical electroencephalographic recordings invariably disclosed an abnormal spike activity from the septal region in patients with schizophrenia which was not obtained from usual scalp leads. Electric stimulation of the septal region produced alertness similar to that which occurred in animals, and biochemical and hematologic changes resembling those evoked by adrenocorticotrophic hormone. Psychiatric and psychological observations following stimulation indicated immediate improvement in emotional responsiveness. In about one half of the patients with schizophrenia, varying degrees of improvement were maintained.

Section IV gives detailed summaries of each case. Section V contains discussions of the project by a distinguished group of clinical and research experts. Perhaps the most penetrating critique (Mettler), points out that technical inaccuracies in electrode placements, imperfect knowledge of the specific septal pathophysiology, and zeal in the psychiatric efforts following stimulation, make doubtful any conclusions reached by the research group.

While the specific technics, limited controls, and methods employed may be faulty, this reviewer considers the Tulane project as a milestone in the investigation of schizophrenia, primarily because the approach used endeavors to obtain objective data rather than indulge in theoretic speculations such as abound in current literature. This fascinating study is therefore highly recommended to all practitioners and students of psychiatry. It may well herald a new and profitable avenue to the understanding of schizophrenia and mind-brain function.

—ALBERT J. GLASS, Col., MC, USA

FUNDAMENTALS OF ANESTHESIA, Prepared under the Editorial Direction of the Consultant Committee for Revision of Fundamentals of Anesthesia, a publication of the *Council on Pharmacy and Chemistry, American Medical Association.* 3d edition. 279 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954. Price $6.

This volume, like previous editions, is a concise, clear outline of the principles of anesthesia, prepared by outstanding authorities. They present the basic principles of anesthesia in regard to physiology, pharmacology, chemistry, and physics; the technical aspects of inducing surgical anesthesia; and the application of these principles to the management of patients suffering from injuries, illness, operations, or the effects of depressant drugs.

The chapters on the physiology, chemistry, and physics of anesthesia and hypnotic drugs are unusually lucid and thorough. There are also excellently written chapters on pre- and post-operative care; on general and regional anesthesia; and on special applications of anesthesia, including obstetric, pediatric, and geriatric problems. Complications and safety measures are also discussed.

There are numerous charts and pictures which simplify the text. Throughout the book the authors have made use of simple, self-explanatory diagrams to illustrate basic principles of physiology, and the technics of administering anesthesia are outlined and illustrated step by step. There is a minimum of verbiage; all that is written is straightforward and to the point.

This book should prove most valuable to the beginner in anesthesiology and to the practicing physician who seeks to familiarize himself with this broad field.

—FRED C. DYE, Col., USAF (MC)

DIENCEPHALON, Autonomic and Extrapyramidal Functions, by *Walter Rudolf Hess,* M. D. 79 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1954. Price $4.

This monograph, designed to analyze the central regulation of the function of the autonomic organs and the subcortical organization of motor functions, originally appeared in German. Many will appreciate the readable summarization of this classical work.

In the first part the author describes the original method of localized stimulation by defined electrical stimuli administered through a precisely placed set of fine electrodes in the diencephalon from which the responses of the unrestrained animal are recorded cinematographically. A circumscribed destruction of the area around a single electrode, accomplished by diathermy, can be identified histologically by a standard technic. Correlation of the information from the original placement of the electrodes, the stimuli employed, the cinematographic record of the responses of the subject, and the histologic demonstration of the stimulated area permits analyses and conclusions regarding spatial organization of functions in the diencephalon, diencephalic motor innervation, and the role of the frontal lobe in autonomic effects. In the second part of the book this discussion of the integration of autonomic functions synthesizes the experimental results and correlates them with classical physiologic principles such as Bernard's *milieu interieur* and a law stated by the author, namely, "the response of the organ is dictated by its functional requirements."

The book is well-written, with many figures and photographs. It will be invaluable to the neurophysiologist and neuropathologist and should find a place in the library of anyone interested in general physiology. There is an excellent bibliography of 139 references which is particularly valuable due to the inclusion of many of the basic European investigations in this field.

—*CHARLES H. STEINMETZ, First Lt., USAF (MSC)*

ORAL SURGERY, by *Sterling V. Mead,* D. D. S., D. Sc., F. A. C. D. 4th edition. 1,478 pages; with 872 text illustrations and 13 color plates. The C. V. Mosby Co., St. Louis, Mo., 1954. Price $25.

As stated in the preface, the purpose of this volume is not to encompass the entire field of oral surgery, but to serve as a ready reference for the dental student and the dental practitioner. It is divided into 35 chapters, the first seven of which present an excellent review of the generalities and basic sciences related to oral surgery, and are exceedingly well-written and compiled. Following a detailed presentation on patient examination and diagnosis, and the technic of procuring an adequate history, wherein a correlation and co-operation with the physician is urged, a thoroughly comprehensive resumé of pre- and post-operative medication is given. Particularly valuable is the section on chemotherapeutic and antibiotic agents. The data on

these drugs has been brought up to date and should prove invaluable to those interested in the most recent findings relevant to the chemotherapeutic and antibiotic agents.

Of special interest to the general dental practitioner is the section of this book which is devoted to periapical and periodontal diseases, the removal of teeth, and the preparation of oral tissues for restorations. Although, for the most part, the illustrations are excellent, many of the flap illustrations for minor oral surgical and dental procedures reveal inadequate flap extensions in relation to the operative area. The chapters on fractures, diseases and malformations of the maxillary bones, and deformities of the jaws adequately present the subject material. The remainder of the volume is divided into sections on the maxillary sinuses, the temporomandibular joint and its derangements, diseases of the salivary glands, the lips, tongue, blood and hemorrhage, emergency measures, cleft lip and palate, oral tumors, and dietary or nutritional measures.

The format of this book is excellent. The index is well-compiled and the extensive bibliographies following each pertinent section provide detailed information on the subject matter. This volume is not sufficiently detailed to be of great value to the dental and the oral surgical specialist. As a reference and a source of information for the dental student and the general dental practitioner, however, it definitely deserves recommendation.

—*ALEX M. MOHNAC, Lt. Col., USAF (DC)*

CEREBROVASCULAR DISEASE, by *James Peter Murphy,* M. D. 408 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1954. Price $12.

This volume should be a welcome addition to any doctor's library, as it will serve to better acquaint him with the vascular diseases of the brain. All phases of diagnosis and treatment are adequately covered and there are several very helpful charts and an ample and up-to-date bibliography. The photographs and the type are good and the style is readable.

The author takes a definite stand on some controversial questions. He gives tacit approval to arteriographic demonstration of thromboses, a clinical problem which frequently creates quite a dilemma. He also warns about the possible dangers of anticoagulant therapy. This should impress those who wish to use these drugs when the diagnosis is uncertain. The reviewer saw no reference to the results of the use of intravenous procaine solution as contrasted with stellate procaine blocks.

The author is to be congratulated, and I agree with Dr. Percival Bailey who states in the foreword that it is a scholarly and useful book and will have a well-merited success.

—*RICHARD W. GARRITY, Capt. (MC) USN*

SURGICAL UROLOGY, by *R. H. Flocks,* M. D., and *David Culp,* M. D. 392 pages; illustrated. Year Book Publishers, Inc., Chicago, Ill., 1954. Price $9.75.

The authors of this new handbook are well-known and eminently qualified urologists. Realizing the need for a compact and concise text of urologic operative surgery, especially for residents in urology, they have presented the more important anatomic, physiologic, and surgical principles involved. The subject matter does not include the preliminary diagnostic features in patients with urologic conditions, but specifically outlines the commonly accepted surgical technical details involved in their management.

All standard urologic operations are described, and each is illustrated with simple original line drawings which are most helpful to the trainee in urology. The majority of the descriptions, as well as the drawings, are complete, with the exception of a few subjects. The descriptions and drawings of perineal prostatectomy are considered inadequate. In a concise, compact text of this sort, not all of the various operative procedures can be given, but the commonly accepted ones have been well outlined.

In keeping with the style and organization of the other handbooks of this series, the descriptions of the operations appear on the left-hand page, with the corresponding illustrations on the right-hand page, for easy reference. Surgery of the various divisions of the genitourinary system is dealt with separately under sections, as is common in most urology texts.

The index is concise and easy to use, but does not include a bibliography. It is the reviewer's opinion that there has long been a need for just such a handbook of operative urology for resident training. It is believed that this book will be useful to the general surgeon who includes urologic procedures in his practice.

—*R. TOWNSEND ARTMAN, Col., MC, USA*

CLINICAL CHEMISTRY IN PRACTICAL MEDICINE, by *C. P. Stewart,* D. Sc., Ph. D., and *D. M. Dunlop,* M. D. 4th edition. 320 pages; illustrated. The Williams & Wilkins Co., Baltimore, Md., 1954. Price $5.

This is a revised edition of a well-established book which was first published in 1931. The authors' purpose is to present to medical students and physicians practical information on biochemistry for the proper interpretation of results of laboratory tests in correlation with a careful history and physical examination of the patient.

The book consists of 15 chapters, two appendixes which are in small print but easy to read, and an adequate index. There is no bibliography. It includes a discussion of the collection and preservation of samples, water and electrolyte balance, normal biochemistry and its disturbances in disease, and various tests for their detection. The material is well-

arranged and written in a clear, concise, and easily readable style and, with the exception of electrophoresis of plasma proteins, is adequately discussed.

Although this volume is not an extensive textbook on biochemistry for laboratory workers, appendix I describes in sufficient detail the method of performing tests that can be readily used in the office or in the hospital ward. A number of other tests of urine, blood, gastric contents, cerebrospinal fluid, and feces are included that are usually regarded as laboratory procedures. Only useful and reliable tests which have stood the test of time are described. Also included in this appendix are methods for the microscopic examination of these materials. Appendix II gives tables showing the normal chemical composition of human urine and blood, and their variations in disease.

This is a handy book for interns, residents, and physicians who frequently may need to review their knowledge of biochemistry.

—PATRICK I. McSHANE, Col., MC, USA

ORAL CANCER, by *J. Roy Bourgoyne*, D. D. S. 295 pages; illustrated. Lea & Febiger, Philadelphia, Pa., 1954. Price $6.50.

This is one of the very few books published which is confined solely to the subject of oral cancer. The author has compiled, condensed, and presented all of the present-day knowledge and the accepted concepts of the management of the cancer patient, with emphasis on prevention by early diagnosis and proper management. The book is directed in its entirety to presenting the over-all concept to the general practitioners of dentistry and medicine. Details and technical descriptions of definitive treatment of the individual patient have been studiously avoided, and therein lies its merit. Far too many cases of early cancer are being suspected and referred by the general dentist only to receive inadequate diagnosis and management by an individual practitioner. The dental profession has made great strides in alerting its general practitioners to early diagnosis, and this book will be a major contribution to early diagnosis and the solution of the present problem of proper management by a competent team.

The subject is presented in 15 chapters. The style avoids excessive use of verbiage and terminology, and, the simplicity of word choice and sentence structure makes for easy understanding. Consistent with the objective of avoiding details of definitive treatment, the illustrations are minimal. Bibliographies support the author in a most creditable manner.

The author is to be commended for a concise presentation of the problem of oral cancer, a problem which should be thoroughly reviewed by all practitioners, whether specialist or general, physician or dentist.

—RICHARD J. BURCH, Col., USAF (DC)

ATTITUDES IN PSYCHIATRIC NURSING CARE, by *Madeline Olga Weiss*, R. N., B. Sc., M. Litt. 111 pages. G. P. Putnam's Sons, New York, N. Y., 1954. Price $2.

This small volume will win your heart. To begin with it is a friendly book; its size, paper cover, and large print say to you "You can pick me up any spare time." You do not have to set aside several days to do it justice. Furthermore, while you are reading it, you feel you are just sitting talking to Miss Weiss. Numerous actual examples of what she was describing came to my mind while reading, and I felt like saying "Yes, that's very true."

This book was received at a time when in our nurses' meetings we were emphasizing working with patients. Our less experienced nurses had asked how to be more effective in patient care, and we had replied by describing actual experiences of our failures and successes with different patients. How delighted I was to receive a book on attitudes at that time and find in it many of the things we had been talking about. The theme is well-developed and thorough. The discussion of attitudes *per se*, as well as the application of these attitudes in relation to the patient, becomes more meaningful than when treated as a single entity.

Miss Weiss' book will be on our recommended reading list; reading it is a learning experience for the new nurse in psychiatric nursing, and a means of crystalizing the thinking of the experienced nurse in this field. Add three cheers for the last chapter, "The Nurse as an Individual." I was so much in agreement that, after reading it I took the afternoon off, cancelled a conference, broke a hair-dresser appointment, and went to the State Fair.

—*LINA STEARNS, Lt. (NC) USN*

SEVENTY-FIVE YEARS OF MEDICAL PROGRESS, 1878-1953 (First Western Hemisphere Conference of the World Medical Association), edited and with a foreword by *Louis H. Bauer*, M. D., F. A. C. P. 286 pages. Lea & Febiger, Philadelphia, Pa., 1954. Price $4.

This volume is a compilation of papers on the history and present status of medicine in 19 medical specialties, and one paper on general practice. The title of the volume was the theme of the 1953 First Western Hemisphere Conference of The World Medical Association, and each of the papers was a contribution to that Conference by a distinguished authority in medicine.

Although a book of this size obviously cannot describe every great advance in medical science during the period covered, it nevertheless does report on some of the most significant discoveries through the past 75 years. Unlike many other similar treatments, most of the authors honestly make an effort at portraying the historical developments in the field of their interest, and these developments are placed in their proper relationship or perspective to other fields of medicine.

The chapter by Dr. Ulrich R. Bryner on general practice is particularly good. In addition to reviewing the factors that altered the nature of general practice from the days of our grandfathers, Dr. Bryner quotes some interesting statistics. Although in the United States there are more physicians in practice today than ever before, there are fewer full-time general practitioners than there were in 1940 or 1880. In the decade of 1940 to 1950, the number of general practitioners decreased by 13 percent and the number of specialists increased by 63 percent.

If one desires more than a cursory discussion of the significant discoveries in medicine during the past 75 years, he will not be able to find it in this book. This volume will be, however, a small but handy adjunct to a reference library.

—*CHARLES L. LEEDHAM, Col., MC, USA*

THE PHYSICAL ENVIRONMENT OF THE FLYER, by Dr. *Heinz Haber.* 179 pages; illustrated. Air University, USAF School of Aviation Medicine, Randolph Field, Tex., 1954.

This is a handbook on the physics of the atmosphere and its relation to flight which will be of interest to all who are engaged in aviation medical research. A valuable condensation of much scientific material, the discussion begins with the gaseous state of matter and proceeds in a logical manner to a consideration of the mechanical and thermal aspects of high speed flights. The atmospheric jet stream phenomenon, capable of boosting airborne speeds by 100 miles an hour, and the problems of bailout at very high altitudes are two of the many major fields of current investigation that the author presents authoritatively.

In reviewing the aeropause, a concept he helped evolve, Dr. Haber says that "the technical means available in aviation today make it necessary to investigate the technical and human problems peculiar to flight in the border area between the terrestrial atmosphere and space. . . . At an altitude of 120 miles the aerodynamic forces of lift and drag vanish completely. This level can be considered the mechanical borders of space for all practical purposes." Though compelling reading, the volume is directed primarily to the serious scientist who requires a ready summary of current, accepted facts in this field. There are a generous number of figures and tables from published works, an adequate index, and a total of 162 references to the literature.

—*ROBERT J. BENFORD, Col., USAF (MC)*

CLINICAL INTERPRETATION OF LABORATORY TESTS, by *Raymond H. Goodale,* M. D. 3d edition. 720 pages; 105 illustrations, 6 in color. F. A. Davis Co., Philadelphia, Pa., 1954. Price $6.50.

This book is an attempt by the author to correlate the laboratory findings in health and disease to the special systems of the body. In part one, there is a brief discussion of the physiology and normal variations of the various body fluids and excreta. This section also includes chapters which would be of interest to laboratory technicians,

medical students, and others engaged in the basic sciences, relative to an understanding of the underlying disease processes associated with the various laboratory procedures. Subjects included here are the basal metabolic rate, a brief outline of liver function tests, and virus, mycotic, and bacteriologic examinations as they pertain to diagnosis in specific circumstances.

In part two, diseases lending themselves to laboratory examination are presented with a brief explanation of each. The common associated laboratory findings which are, by tradition, expected to be found in these disease states are mentioned, and in some instances discussed.

As a ready reference for the medical student, technologist, or busy practitioner this book should fill a need. There are a number of above-average illustrations which merit special attention. As a complete text, it is not recommended for the serious student of internal medicine or the professional laboratory technician.

—*WILLIAM L. CHAPMAN, Lt. (MC) USN*

APHASIA THERAPEUTICS, by *Mary Coates Longerich,* Ph. D., and *Jean Bordeaux,* Ph. D. 185 pages. The Macmillan Co., New York, N. Y., 1954. Price $3.75.

The authors describe in considerable detail and almost in outline form their technic for the appraisal and retraining of patients with aphasia. Commendable attention is given to the assessment of residual capacities, interests, personality traits, and psychologic factors, and of their influence on the retraining process.

One cannot avoid sensing the high degree of patience, skill, and empathy required in successful aphasia therapy. A valuable contribution is a preliminary section of the book devoted to symptomatology in which consideration is given to correlation of symptoms with the anatomic location of injury. The treatment of this material is too detailed for this type of book. A simplified classification with omission of anatomic references would probably have served as well to introduce the sections on appraisal of functional deficits and residual capacities which mainly form the basis for retraining efforts. Most physicians probably will disagree with the inclusion of hysteria in the discussion. While the authors may not have intended it, the impression is given that they regard the treatment of hysteria with the use of hypnosis as within the sphere of responsibility of the aphasia therapist. Beyond occasional superficial symptomatic similarity in hysteria to loss of function resulting from brain injury, there does not appear to be any justification for this connection.

In general, this is an informative book which should be of value to physicians and others interested in knowing more about retraining technics in aphasia, agnosia, and apraxia.

—*WILLIAM H. ANDERSON, Lt. Col., MC, USA*

NONTUBERCULOUS DISEASES OF THE CHEST, edited by *Andrew L. Banyai*, M. D. 1,152 pages; 280 illustrations. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $18.75.

This volume is a collective and co-operative project by 37 contributors from the United States, Argentine, England, India, and Mexico. It includes chapters on the physiology and pathologic physiology of respiration; the bacterial, viral, parasitic, and mycotic diseases of the chest; tumors of the lung and mediastinum; industrial diseases; congenital anomalies; and diseases of vascular origin. Most of the chapters present a comprehensive coverage of the subject with excellent bibliographies attached. Many of the references by foreign authors are to foreign literature and are not always readily available in this country. References to some recent authoritative reports published in this country have been omitted. The inclusion of articles by outstanding authorities from other countries, however, broadens the scope of the coverage of material.

The specific treatment of some infectious diseases, particularly with reference to antibiotic therapy, is already somewhat out of date; however, the general fundamentals of treatment are well covered.

This is an excellent book and, I believe, the most comprehensive and complete volume on the subject of nontuberculous diseases of the chest. It should be in all medical libraries and will prove to be an excellent reference for all interested in these conditions.

—JAMES A. WIER, Lt. Col., MC, USA

PRACTICAL FULL DENTURE PROSTHESIS, by *Joseph Simeon Landa*, D. D. S. 2d edition. 501 pages; 218 illustrations. Dental Items of Interest Publishing Co., Inc., Brooklyn, N. Y., 1954. Price $9.50.

This text is a practical guide for the dental practitioner in the treatment of the edentulous patient and should be an invaluable addition to the library of the general practitioner or postgraduate student. It contains many practical suggestions based on sound principles. The chapters are arranged in logical sequence, with the exception of those on tooth arrangement, occlusion, and articulation.

The chapter on anatomic and physiologic considerations points out many areas which warrant special attention in complete artificial denture construction; however, the explanation based on the anatomy of some of these areas is not coincident with a more detailed study of the subject. The discussion of denture base materials will not be enlightening to those seeking information on the methyl methacrylate and chrome cobalt alloys. The discussion of the free-way space is informative, but the method of measurement, employing the author's device, is debatable. In "Phonetics in Complete Denture Prosthesis" the author describes the use of phonetics as an aid to proper anterior tooth arrangement and to the establishment of correct vertical dimension. The description of the tongue position in pronouncing the various conso-

nants is questionable, however. The chapters by Schuyler and Nagle are excellent additions to the text.

The book is written in an uncomplicated, easy-flowing style, and the number of illustrative photographs and diagrams is adequate. That the author made a thorough review of the literature in the field is evidenced by the extensive bibliography. The index, too, is very complete, but both bibliography and index should have been listed in the table of contents under their own headings.

—LESLIE R. ALLEN, Lt. Col., USAF (MC)

THE ROENTGENOLOGIST IN COURT, by *Samuel Wright Donaldson,* M. D. 2d edition. 358 pages. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $7.75.

This readable, informative, and interesting volume is concerned with the relationship between radiologic practice and the law, a subject of the greatest importance to physicians in this specialty. As the author points out, any radiologist (as well as any other physician) is likely some day to appear in a courtroom, either as a defendant or as a witness in a malpractice suit. This book is intended to help prepare him for the time when he may be served with a subpoena, and even more important to educate him in the field of malpractice prevention.

There is an ever-increasing seriousness of the hazards to physicians of the malpractice suit. During 1952, one in every 38 physicians in the United States was sued for malpractice, for a total of 4,000 suits—a tenfold increase since 1929. Furthermore, the average amount of the judgments against physicians has greatly increased. As a result, malpractice insurance is becoming more difficult to obtain.

Radiologic practice is in the vanguard of medical specialties plagued by the legal hazard of malpractice action. The author believes that much can and must be done to improve this alarming situation. There exists great opportunity to improve the personal and public relations of physicians, and the author specifies what measures can be effectively used.

The chapter headings indicate the scope of the work: Relationship between Physician and Patient; Malpractice; The Physician and the Law of Agency; Malpractice Defense and Prophylaxis; Evidence and Testimony; Privileged Communications; Expert Testimony; Expert Witness Fees; X-Ray Films as Evidence; Ownership of Films; Physicians and Contracts; X-rays and Dentistry. The text contains citations totaling 400 cases. These cases are tabulated both alphabetically and geographically by states for ready reference. There is a bibliography and a good index.

The book is attractively printed and is a pleasure to read, thanks to the author's selection of material and to his excellent style of presentation. No radiologist who starts the book will fail to finish it; certainly every radiologist should read it.

—CARR E. BENTEL, Capt. (MC) USN

New Books Received

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be selected for review in a later issue.

COLOR ATLAS OF PATHOLOGY, Volume 2, Endocrine System, Including Pituitary, Thyroid, Parathyroid, Adrenals and Pancreas; Gynecology and Obstetrics, Including Reproductive Organs; Breasts; Male Genital Tract; Skin. Prepared under the auspices of the U. S. Naval Medical School of the National Naval Medical Center, Bethesda, Md. 450 pages; illustrated with 1,032 figures in color on 343 plates. J. B. Lippincott Co., Philadelphia, Pa., 1954. Price $20.

THE NEUROANATOMICAL BASIS FOR CLINICAL NEUROLOGY, by *Talmage L. Peele,* M. D., Associate Professor of Anatomy in Charge of Neuroanatomy, Assistant Professor of Medicine, Duke University School of Medicine. 564 pages; illustrated. McGraw-Hill Book Co., Inc., New York, N. Y., 1954. Price $12.50.

BLOOD GROUPS IN MAN, by *R. R. Race,* Ph. D. (Cambridge), M. R. C. S. (England), F. R. S., Director, Medical Research Council Blood Group Research Unit, The Lister Institute, London, and *Ruth Sanger,* Ph. D. (London), B. Sc. (Sydney), Medical Research Council Blood Group Research Unit, The Lister Institute, London; with a Foreword by Professor *Sir Ronald Fisher,* F. R. S. 2d edition. 400 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $7.50.

THE DISTRIBUTION OF THE HUMAN BLOOD GROUPS, by *A. E. Mourant,* M. A., D. Phil., D. M. (Oxon), Director, Medical Research Council Blood Group Reference Laboratory, The Lister Institute of Preventive Medicine, London; Honorary Member of Staff, The Lister Institute; Honorary Adviser, Nuffield Blood Group Centre; Sometime Visiting Professor of Serology, Columbia University in the City of New York; With a Foreword by Professor *H. J. Fleure,* F. R. S. 438 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $8.75.

RETROPUBIC PROSTATECTOMY, For Benign Enlargement of the Prostate Gland, by *Francis A. Beneventi,* M. D., F. A. C. S., Attending Urologist, Oswald Swinney Lowsley Foundation, St. Clare's Hospital; Attending Urologist, Lincoln Hospital; Associate Attending Urologist, New York Polyclinic Hospital and Medical School; Assistant Attending Urologist, James Buchanan Brady Foundation of the New York Hospital, New York, N. Y. Art direction and 44 original drawings by *William P. Didusch.* 227 pages. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $11.

BIOCHEMISTRY, by *Abraham Cantarow,* M. D., Professor of Biochemistry, Jefferson Medical College, and *Bernard Schepartz,* Ph. D., Assistant Professor of Biochemistry, Jefferson Medical College. 848 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954.

SELECTED WRITINGS OF FLORENCE NIGHTINGALE, compiled by *Lucy Ridgely Seymer,* M. A. (Oxon.), S. R. N. 396 pages. The Macmillan Co., New York, N. Y., 1954.

FLUID THERAPY, by *James D. Handy,* M. S. (Chem.), M. D., F. A. C. S., Associate Professor of Surgery and Director of the Surgical Laboratories, Medical College of the University of Tennessee, Memphis; Diplomate, American Board of Surgery and American Board of Thoracic Surgery. 255 pages; 77 illustrations; 8 tables. Lea & Febiger, Philadelphia, Pa., 1954. Price $5.50.

THE YEAR BOOK OF OBSTETRICS AND GYNECOLOGY (1954-1955 Year Book Series), edited by *J. P. Greenhill, M. D.,* F. A. C. S., Professor of Gynecology, Cook County Graduate School of Medicine; Attending Gynecologist, Cook County Hospital; Attending Obstetrician and Gynecologist, Michael Reese Hospital; Associate Staff, Chicago Lying-in Hospital; Author of Office Gynecology, Obstetrics in General Practice, and Principles and Practice of Obstetrics. 544 pages. The Year Book Publishers, Inc., Chicago, Ill., 1954. Price $6.

FREEDOM FROM FEAR, by *Lester L. Coleman,* M. D. 285 pages. Hawthorne Books, Inc., New York, N. Y., 1954. Price $3.95.

CLINICAL ORTHOPAEDICS, by *Anthony F. DePalma,* Editor-in-Chief, with the assistance of the Associate Editors and the Board of Advisory Editors. Number Four. 240 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1954. Price $7.50.

SIMPLIFIED DIABETIC MANAGEMENT, by *Joseph T. Beardwood, Jr.,* M. D., F. A. C. P., Professor of Diseases of Metabolism, Graduate School of Medicine, University of Pennsylvania; Director of Medical Services, Abington Memorial Hospital, Abington, Pa.; Chief of the Metabolic Department, Philadelphia General Hospital - Northern Division; Consultant to the Metabolic Service of the Presbyterian Hospital in Philadelphia, and *Herbert T. Kelly,* M. D., F. A. C. P., Associate in Medicine, Graduate School of Medicine, University of Pennsylvania; Associate Physician, Presbyterian Hospital; Chief, Department of Medicine, Doctors' Hospital; Chairman of the Committee on Nutrition, Medical Society of the State of Pennsylvania; Honorary Chairman, Pennsylvania Nutrition Council. 6th edition. 194 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1954. Price $3.

DONOVANOSIS (Granuloma Inguinale, Granuloma Venereum), by *R. V. Rajam,* M. S., F. R. C. P., Director, Venereal Disease Department, Government General Hospital, Madras; Professor of Venereal Diseases, Madras Medical College, Madras; Formerly WHO Consultant on Venereal Infections and Treponematoses; and *P. N. Rangiah,* M. D., Associate Professor of Venereal Diseases, Madras Medical College, Madras; Physician, Venereal Diseases Department, Government General Hospital, Madras. World Health Organization Monograph Series No. 24. 72 pages; illustrated. World Health Organization, Palais Des Nations, Geneva, Switzerland, publisher, 1954. Columbia University Press, New York, N.Y., distributor. Price $1.50.

THE PSYCHOLOGICAL VARIABLES IN HUMAN CANCER, A Symposium Presented at the Veterans Administration Hospital, Long Beach, Calif., October 23, 1953, edited by *Joseph A. Gengerelli,* Professor of Psychology, University of California at Los Angeles, and *Frank J. Kirkner,* Chief Clinical Psychologist, Veterans Administration Hospital, Long Beach Calif., and Associate Clinical Professor of Psychology, University of California at Los Angeles. 135 pages. University of California Press, Berkeley and Los Angeles, Calif., 1954. Price $3.

TEXTBOOK OF MICROBIOLOGY, by *William Burrows,* Ph. D., Professor of Bacteriology, Department of Bacteriology and Parasitology, the University of Chicago; with the collaboration of *Francis Byron Gordon,* Ph. D., M. D., Head, Division of Virology, Naval Medical Research Institute, National Naval Medical Center, Bethesda, Md.; formerly Professor of Bacteriology, Department of Bacteriology and Parasitology, the University of Chicago; *Richard Janvier Porter,* Ph. D., Associate Professor of Parasitology, School of Public Health, the University of Michigan; *James William Moulder,* Ph. D., Associate Professor of Biochemistry, Department of Bacteriology and Parasitology, the University of Chicago. 16th edition. 824 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954.

FLUID AND ELECTROLYTES IN PRACTICE, by *Harry Statland,* M. D., Associate in Medicine, University of Kansas School of Medicine; Consultant in Medicine, Veterans Administration Hospital, Kansas City, Mo.; Attending Physician, Menorah Medical Center, Kansas City, Mo. 206 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1954. Price $5.

RENAL FUNCTION, Transactions of the Fifth Conference, October 14, 15, and 16, 1953, Princeton, N. J., edited by *Stanley E. Bradley,* M. D., Associate Professor of Medicine, Columbia University, College of Physicians and Surgeons, New York, N. Y. 218 pages; illustrated. Sponsored by Josiah Macy, Jr. Foundation, New York, N. Y., 1954. Printed by Corlies, Macy & Co., Inc., New York, N. Y. Price $3.75.

STELLATE GANGLION BLOCK, Techniques, Indications, Uses, by *Daniel C. Moore,* M. D., Director, Department of Anesthesiology, Mason Clinic; Chief of Anesthesia, Virginia Mason Hospital, Seattle, Wash. 280 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $10.50.

THE PYRAMIDAL TRACT, Its Status in Medicine, by *A. M. Lassek,* M. D., Ph. D., Professor of Anatomy, Boston University School of Medicine, Boston, Mass. American Lecture Series, Publication Number 233, A Monograph in The Bannerstone Division of American Lectures in Anatomy, edited by *Otto F. Kampmeier,* Ph. D., M. D., Professor of Anatomy and Head of Department, 1928-1951, Professor of Anatomy, Emeritus, 1953, Professor of Medical History, 1951-1953, University of Illinois College of Medicine, Chicago, Ill.; Head of Department of Anatomy, School of Medicine, College of Medical Evangelists, Loma Linda, Calif. 166 pages. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $4.75.

THE MANAGEMENT OF ENDOCRINE DISORDERS OF MENSTRUATION AND FERTILITY, by *Georgeanna Seegar Jones,* M. D., Assistant Professor of Gynecology, The Johns Hopkins University; Gynecologist, The Johns Hopkins Hospital, Baltimore, Md. American Lecture Series, Publication Number 206, A monograph in the Bannerstone Division of American Lectures in Endocrinology, edited by *Willard O. Thompson,* M. D., Clinical Professor of Medicine, University of Illinois College of Medicine, Chicago, Ill. 198 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $5.75.

TEXTBOOK OF PEDIATRICS, edited by *Waldo E. Nelson,* M. D., Professor of Pediatrics, Temple University School of Medicine; Medical Director of Saint Christopher's Hospital for Children. With the collaboration of 70 contributors. 6th edition. 1,581 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1954.

A PRACTICAL MANUAL OF DISEASES OF THE CHEST, by *Maurice Davidson,* M. A., M. D. Oxon., F. R. C. P. Lond., Consulting Physician to the Brompton Hospital for Consumption and Diseases of the Chest; Sometime Associate Physician to the Royal Cancer Hospital; Consulting Physician to the Miller General Hospital for South-East London; Consulting Physician to the Western Ophthalmic Hospital; with the assistance of *John H. Friend,* M. D. Lond., M. R. C. P. Lond., Saltwell Research Scholar, Royal College of Physicians; Late Senior Registrar, Middlesex Hospital. 4th edition. Oxford Medical Publications. 647 pages; illustrated. Oxford University Press, New York, N. Y., 1954. Price $19.25.

COMPARATIVE ANATOMY OF THE VERTEBRATES, by *George C. Kent,* Jr., Associate Professor of Zoology, Louisiana State University. 530 pages; illustrated. The Blakiston Co., Inc., New York, N. Y., 1954. Price $6.

TREATMENT OF ACUTE POLIOMYELITIS, edited by *William A. Spencer,* M. D. From the Departments of Pediatrics, Physiology, and Physical Medicine, Baylor University, College of Medicine; Southwestern Poliomyelitis Respiratory Center, Jefferson Davis Hospital. In Cooperation with The National Foundation for Infantile Paralysis, Inc. 134 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $3.75.

SHOULD YOU DRINK . . ., by *Charles H. Durfee,* Ph. D. 152 pages. The Macmillan Co., New York, N. Y., 1954. Price $2.49.

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